How Artificial Intelligence Can Improve Digital Marketing

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ABSTRACT

Recent technological advances have allowed the growth of digital marketing, creating the challenge of Big Data. AI emerges to deal with this paradigm and marketing becomes a natural beneficiary, as it takes advantage of data in its processes. This research aims to evaluate the potential impact of AI on digital marketing. This knowledge could accelerate the adoption of AI technologies, revolutionizing the area. The following techniques were developed: survey for digital marketing professionals to identify their needs; research of AI solutions; coverage and match analysis between needs and solutions. This research establishes which digital marketing aspects need further development and recommends response solutions: Bloomreach Experience Cloud for customer experience; Alli AI and Market Brew for SEO; Concured for content marketing; Automizy for email marketing; Cortex for social media marketing; Adobe Advertising Cloud for online advertising; Conversica and Drift Automation for communication; SAS VDMML and SAS VF for data analysis.

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1. Introduction

Over the past decades, it has been common to read dramatic predictions about the technological advances and how they can radically change certain areas of work (Wirth, 2018). Today, almost every field of modern life benefits from computing and communication technologies, and marketing is one of them (Farah, Bonnet and Damaj, 2020), often using such technologies to improve working methods for more efficient and effective results (Kose and Sert, 2017). Technological advances have allowed the evolution from traditional marketing to digital marketing, which uses channels such as the Internet to open new ways for industries to advertise and sell their products to customers (Rao et al., 2016). With these advances, a new paradigm for marketing also emerges - Big Data (Mathrani, 2021). For many years, the focus of marketers was on how to find data to use as a basis for all strategic decisions, however, due to the latest technological advances, a new problem arises: this is no longer about how to find data, but how to deal with its excess. Despite this explosion of data and computing power, recent research suggests that, of all the available data, only 0.5% is analyzed and used to make business decisions (Gantz and Reinsel, 2012). Here's the problem: How can marketers extract significant intelligence from large amounts of data and transform it into high-value, personalized customer experiences? (Kumar et al., 2019; Olson and Levy, 2018).

In parallel, Artificial Intelligence (AI) has also been evolving and is one of the major trends in the world today. The recent popularity of AI is due to three main factors: the growth of Big Data; the availability of cheap and scalable computing power and the development of new AI techniques. For the business world, AI emerges as a possible solution to deal with the large amounts of data that companies are facing today (Wirth, 2018).

Marketing becomes a natural beneficiary of the development of information technology, namely of AI (Paschen, Kietzmann and Kietzmann, 2019), as it takes advantage of data in most of its processes - from consumer needs research, market analysis, customer insights and competition analysis, to measuring the results of the adopted strategies (Jarek and Mazurek, 2019). In this regard, it is of utmost interest to evaluate the potential impact the application of AI can have on digital marketing. This knowledge might accelerate the adoption of AI technologies by all stakeholders and possibly revolutionize the digital marketing field.

The impact of AI on marketing thus extends to several levels, according to different authors: marketing methods according to Theodoridis and Gkikas (2019), marketing management/strategy according to Davenport (2020), Jarek and Mazurek (2019), Kumar (2019) and Olson and Levy (2018), consumer behavior and political issues according to Davenport (2020). The different authors point to the great potential of applying AI in marketing. Their articles present both a contemporary perspective, observed by the different current applications of AI in marketing presented by Jarek and Mazurek (2019) and Theodoridis and Gkikas (2019), and a future perspective presented by Davenport (2020) and different mentioned studies. The analyzed articles mention the potential and level of application of AI in different aspects of digital marketing, however, they do not concretely analyze the problems or needs that, in fact, exist in digital marketing today and that might constitute an opportunity for the application of AI. In this regard, it would be of all interest to understand the main problems, difficulties or needs that digital marketing professionals currently face.

On the other hand, in their study, Jarek and Mazurek (2019) carried out a research to assess the extent of AI implementation in marketing, by collecting and analyzing the existing AI solutions. Their research allowed to evaluate the extent to which AI is currently applied in marketing, for each marketing mix area. An area for further work which can be identified is, in a similar perspective to the work developed by Jarek and Mazurek (2019), the research and detailed analysis of the existing AI solutions for each area of digital marketing, namely: Website/CX (Client Experience); SEO; Content Marketing; Email Marketing; Social Media Marketing; Online Advertising; Communication and Sales; Strategy and Data Analysis. It would be interesting to understand which AI technological solutions with applicability in the different areas of digital marketing currently exist in the global market and what their features are.

Finally, several authors study the current and future impact of AI in digital marketing, exemplifying solutions and general benefits. However, the existing literature, despite presenting the general benefits of using AI in marketing or even the extent of its applicability, does not address the concrete responsiveness of the existing AI solutions to the needs of marketing professionals (e.g.

Capatina et al., 2020). In order to understand the real impact of AI in marketing, it would be interesting to evaluate the level of coverage that AI solutions offer in relation to the general needs of digital marketers, finding the most complete solution. In addition, it would be important to understand which solutions best respond to the specific needs of the professionals. The answer to these questions would allow a greater understanding of the potential impact that the application of AI can have on digital marketing. This knowledge could accelerate the adoption of AI technologies by all stakeholders and possibly revolutionize the digital marketing field.

This research aims to assess the potential level of impact that AI can have on digital marketing and the literature review on the subject led to the identification of gaps and areas for further development. Accordingly this study has the following objectives: (i) development of a survey addressed to digital marketing professionals in order to identify the main problems, difficulties or needs in their profession; (ii) research, collection and analysis of AI technological solutions with applicability in the different areas of digital marketing, existing in the global market; (iii) analysis of the digital marketing solutions; (iv) match analysis between the aspects of each digital marketing area that obtained the worst score in the survey and the solutions with response capability.

To reach these objectives we adopted a mixed method study was conducted, combining a qualitative approach based on document analysis with a quantitative study using an online survey using a non-probabilistic sample.

2. Literature Review

This section is focused on the literature review. It starts with the presentation of the main concepts, then, the current context of AI is described and the section ends with the presentation of the impacts of the AI on marketing activities.

2.1 Current Marketing Context

The technological advances of the last decades have raised some dramatic concerns and predictions, such as how they may destroy or radically change certain areas of work, such as marketing (Wirth, 2018). These concerns have their origin in several breakthroughs, including personal computers, the Internet, smartphones (Kumar et al., 2019), social networks (Wirth, 2018) and Big Data (Olson and Levy, 2018; Wirth, 2018). However, technological advances are an opportunity for evolution and innovation. They generate structural changes in companies' strategies and change business paradigms, generally improving knowledge potential in managing customer needs and delivering products and services (Kumar et al., 2019). In addition, existing research has shown that companies in a knowledge-based environment create, disseminate and use knowledge as a key source of competitive advantage (McEvily and Chakravarthy, 2002). Today, almost all fields of modern life benefit from computing and communication technologies. Marketing is one such field, and often uses these technologies to improve working methods for more efficient and effective results (Kose and Sert, 2017). As a result of the use of computing and communication technologies in the field of marketing, particularly the Internet, the concepts of digital marketing, Internet marketing, social media marketing, etc. have emerged (Tantawy and George, 2016). Digital marketing uses channels such as the Internet to open new ways for industries to advertise and sell their products to customers (Rao et al., 2016).

With these technological advances, a new paradigm for marketing also emerges - Big Data. For many years, the focus of marketers was on how to find data to use as a basis for all strategic decisions, however, due to the latest technological advances, another problem arises: it is no longer about how to find data, but how to deal with its excess. Olson and Levy (2018) state in their research that in 2017, 90% of the total data on the planet had been created in the last 2 years alone - a pace of production that is expected to increase. In addition, about 80% to 90% of this data is unstructured, which means that the main business insights are located in large amounts of emails, social media publications, video transmissions, web searches, POS systems, etc. Despite this explosion of data and computing power, recent research suggests that, of all the available data, only 0.5% is analyzed and used to make business decisions (Gantz and Reinsel, 2012). Here's the problem: how can marketers extract significant intelligence from large amounts of data and transform it into high-value, personalized experiences for the end customer? (Olson and Levy, 2018).

It is in this context that AI emerges in marketing. According to Olson and Levy (2018), AI, alongside its sister disciplines of Big Data and Machine Learning, is positioned to bridge the gap between large amounts of data and valuable extractions such as business insights, predictive power and personalization. AI is also expected to influence marketing strategies and customer behavior (Davenport et al., 2020). According to a Salesforce research, AI will be the most adopted technology by marketing professionals in the coming years (Columbus, 2019). This research also indicates that marketing professionals plan to use AI in areas related to marketing strategy (such as segmentation and analytics) and customer behavior (such as messaging, personalization and predictive behaviors) (Columbus, 2019). Another research developed by McKinsey and Co. indicates that the greatest potential value of AI refers to areas related to marketing and sales (Chui et al., 2018). The necessary factors to allow AI to fulfill its promises may already be established - it was stated that this very moment is the great turning point of history (Reese, 2018, p.38). However, this claim is arguable. Despite the promising impact of AI in marketing, there are some challenges. Although AI has several possible applications in various scientific fields, it has been observed that its implementation is particularly complex in marketing. Due to the qualitative, quantitative and strategic nature of the problems that can occur, the decision makers in digital marketing need more than an efficient computational approach. Factors such as knowledge from professional experience, area of expertise, judgment calls and a demanding and constantly changing environment, turn decision-making into a difficult task for AI (Theodoridis and Gkikas, 2019). On the other hand, the required technological capability may not yet exist (Capatina et al., 2020; Davenport et al., 2020). In addition, there are widespread concerns associated with its use. Technologists like Elon Musk believe that AI is dangerous (Metz, 2018). Davenport (2020) further mentions that AI may not fulfill all its promises because of the challenges it introduces regarding data privacy, biased algorithms, and ethics.

2.2 Digital Marketing

The digital age gave consumers the opportunity to express their opinions and search for information, products or services, increasing their power of choice and influence. At the same time, brands have the opportunity to interact dynamically with their customers. Digital marketing has given companies the ability to expand their reach into digital channels, creating value for both customers and businesses. One of the great objectives of a company is to create trust with its customers and they tend to respond positively when brands manage to create an inviting and customer-oriented environment, and digital marketing allows the creation of this more personalized and interactive environment. Digital marketing processes, such as the study of customer profiles, target audiences and consumer behavior, increase customer connection with the brand and create higher quality services, higher revenue and greater user experience satisfaction (Theodoridis and Gkikas, 2019).

Digital marketing management can be done in several ways. However, for greater uniformity, Dave Chaffey proposed the RACE (Chaffey and Ellis-Chadwick, 2019; Chaffey and Patron, 2012). The RACE framework summarizes the main online marketing activities that need to be managed as part of digital marketing. RACE covers the entire customer life cycle: (Plan) - Reach - Act - Convert - Engage (Chaffey, 2017). Following this framework, Theodoridis and Gkikas (2019) identify some of the most representative digital marketing platforms. The *Plan* phase corresponds to the creation of the overall digital strategy, goal setting and planning (Chaffey, 2017). Some of the most relevant planning platforms are Google Analytics, which provides an overview of the behavior of a website, and Salesforce CRM which helps companies manage their customer relationships (Theodoridis and Gkikas, 2019). The *Reach* phase is about attracting potential customers and involves creating awareness about the brand and its products and services, in order to increase traffic to the company's digital channels (Chaffey and Patron, 2012). Some examples of outreach platforms include Google Ads for ad creation and MailChimp that helps brands find, reach and engage potential customers (Theodoridis and Gkikas, 2019). *Act* is short for Interact (Chaffey, 2017) and corresponds to persuading website visitors or potential customers to take the next step of interaction in their journey as a customer, when they reach the company channel. It can mean finding out more about the company or its products, searching to find a product or reading a publication. It consists of keeping the clients interested and engaged so that they do not click the "back" button (Chaffey and Patron, 2012). The Hootsuite platform, for example, helps companies to interact with the client, allowing them to monitor, manage and schedule their publications on several social networks (Theodoridis and Gkikas,

2019). *Convert* is the phase in which the visitor commits to forming a relationship that will generate commercial value for the business (Chaffey and Patron, 2012). It can refer to any desired action that marketing professionals have defined as a goal, such as a purchase or client registration. The Crazy Egg platform, for example, records any user action and keeps visual records in order to understand the behavior of users on a website and through A/B testing understands which version of the website leads to more conversions (Theodoridis and Gkikas, 2019). The *Engage* phase corresponds to building relationships with the client over time to achieve retention objectives, through activities such as social media and email marketing (Chaffey and Patron, 2012). It consists of ensuring that the client continues to be involved and interacting with the brand, even after its conversion. Google Ads Remarketing engages an organization's audience through remarketing/retargeting techniques, reaching potential customers who have left the website without any purchase action (Theodoridis and Gkikas, 2019).

In order to understand the impact that AI can have in digital marketing, it is important to have a better understanding of its specific and current methods, namely: SEO (Alexander, 2019); Social Media Marketing (Alexander, 2019); Content Marketing (Alexander, 2019); Pay-Per-Click - PPC (Alexander, 2019); Affiliate Marketing (Alexander, 2019); Native Advertising (Alexander, 2019); Marketing Automation (Alexander, 2019); Email Marketing (Alexander, 2019); Chatbots (Rajanarthagi, 2019); Semantic Search (Rajanarthagi, 2019); Content Creation (Rajanarthagi, 2019); Ad Targeting (Rajanarthagi, 2019); Predictive Marketing (Rajanarthagi, 2019); Voice Search (Rajanarthagi, 2019); A/B Testing (Rajanarthagi, 2019); Lead Scoring (Rajanarthagi, 2019); Web Development (Rajanarthagi, 2019).

2.3 Current Context of AI

Artificial Intelligence is one of the greatest trends in the world today. The number of AI startups is growing fast, there are more and more conferences dedicated to the subject, and one hears a lot about large companies who invest large amounts of money in AI-related developments. In a way, this is not a surprise, as there has been a lot of discussion regarding machine learning, deep learning, and analytics in the last years. All of these developments are related to the fact that data alone, acclaimed as the "new oil", is not enough. For the business world, AI thus emerges as a possible solution to deal with the large amounts of data that companies face today (Wirth, 2018). On the other hand, one may wonder why it is that only more recently there is talk about AI, when it has existed for a few decades. Over the years, AI has been appearing and disappearing from the center of attention, depending on the level of its progress and the increase of its applicability potential. The interest and extensive discussion about AI were caused by the first large-scale commercial applications of AI, which showed the potential and capabilities of this technology, also in the marketing area (Jarek and Mazurek, 2019). The recent popularity of AI is due to three main factors: the growth of Big Data; the availability of cheap and scalable computing power and the development of new AI techniques. The amount of data and computational power required to implement AI methods has only been achieved more recently, with the Big Data revolution and the emergence of more powerful computing systems. In addition, the development of new AI methods, such as deep learning, allowed to take advantage of both large amounts of data and superior computational power (Darwiche, 2018). The most recent developments, such as Big Data, although presenting a challenge for companies, have allowed the evolution of AI, which seems to be positioned to solve this challenge (Olson and Levy, 2018). However, before assessing what its possible impact is, it is important to understand what AI consists of. What does AI actually mean? Is it just a synonym of extremely powerful algorithms and neural networks or is it something else? The current hype around AI is creating a confusing picture, asking for clarification (Wirth, 2018).

AI operates in the field of automation and continuous learning, acting as the intelligence that drives analysis and decision making focused on data. Through various techniques such as deep learning, genetic algorithms and natural language processing, AI has the ability to educate machines to recognize patterns in large amounts of data and to perform appropriate actions, thus enabling the automation of tasks that can help in the creation and management of an organization's offerings. Another way to describe AI depends not on its underlying technology, but on its business and marketing applications, such as automating business processes, gathering insights from data, or interacting with customers and employees (Davenport and Ronanki, 2018). AI offers the potential to increase revenues through better marketing decisions and reduce costs through task and service

automation (Davenport et al., 2020). From a more technical perspective, AI refers to the idea that computers, through the use of software and algorithms, can think and execute tasks like human beings (Kumar et al., 2019). According to Wirth (2018) and Overgoor (2019), AI is the intelligence exhibited by machines. In computer science, the field of AI research defines itself as the study of "intelligent agents" - any device that perceives its environment/context and performs actions that maximize its chance of success in a given goal. This information can be interpreted into - "computers do things that require intelligence when performed by humans" (Copeland, 2000). Analyzing these definitions, one can easily perceive the "Artificial" in AI - it means that machines/computers are doing something, and not humans. Regarding the "Intelligence" in AI, as mentioned in the definition, it is related to the ability to "think" and "understand its context", which is very specific in mapping decisions with data assets (Mathrani, 2021). But what does intelligence consist of in reality? How can a machine think? As Wirth (2018) says, human beings are always thinking, but it's not easy to distinguish thinking from purely mechanical processing. However, the author indicates the main aspects of "thinking" that constitute "intelligence" in AI, which allow a better understanding of what it represents, namely: learning, knowledge representation, reasoning, and forecasting/planning. It can finally be concluded that AI consists of the capabilities of learning, knowledge representation, reasoning and prediction displayed by machines, in the execution of actions that maximize their probability of success in a given goal.

AI can also be categorized according to different types:

- **Narrow AI:** adapted to a specific problem or task and cannot handle other challenges without being re-trained or modified. Narrow AI systems fall short of the flexibility of human intelligence but can be quite powerful in their area. In fact, they usually seek to beat humans in their specific domain. Practically all AI that is currently operational falls into this category. Some known examples are Siri, Google Assistant and Alexa (Shanahan, 2015; Wirth, 2018).
- **Strong AI:** Strong AI or Artificial General Intelligence (AGI) is a system as powerful and flexible as human intelligence and it's not adapted just to a specific problem or task. An AGI can adapt to new contexts beyond those in which it has been trained (Davenport et al., 2020). It's usually this category that is popularized and portrayed in movies, but so far it's fair to assume that it's nothing more than science fiction because it hasn't yet been achieved (Sterne, 2017; Wirth, 2018).
- **Hybrid AI:** AI solutions that combine multiple Narrow AI modules (Greenwald, 2011), a category that is growing at a fast pace (Martinez de Pisón et al., 2017). The rapid growth of Narrow AI can be observed with increasingly versatile solutions and, in addition, the emergence of extremely powerful new AI systems, some of which incorporate multiple Narrow AI solutions, with the ability to adapt to new challenges. These systems have not yet reached the point of a Strong AI but are more than a Narrow AI. A good example is IBM's Watson, a platform that aggregates several AI solutions applicable in different areas and contexts of an organization (Wirth, 2018).

AI derives from information technologies and there are many concepts associated to AI that appear whenever this topic is discussed, sometimes in a confusing way or used as synonyms of AI. For a clear picture of what AI consists of, it is important to clarify these concepts, namely machine learning, data mining (Overgoor et al., 2019), deep learning and natural language processing (Jarek and Mazurek, 2019). The current potential of AI is largely at the level of Narrow AI and tasks are performed mainly thanks to the development of three technologies: machine learning, deep learning and natural language processing (Jarek and Mazurek, 2019). AI has recently become popular because it provides a cheap way to make predictions about complex problems based on data from past examples. Machines are usually more capable of predicting than humans and can do so much faster. Machine Learning (ML) is a set of methods that can automatically detect patterns in data and use them to predict future data, or to perform other types of decision making in uncertain contexts (Murphy, 2012). Although AI encompasses more than just ML, most applications of AI in marketing fall within the field of ML, usually related to the predictive capability (Overgoor et al., 2019), namely: pattern recognition, statistical modeling, data exploration, knowledge discovery, predictive analysis, adaptive systems and many others (Jarek and Mazurek, 2019). Another term widely used in conjunction with AI is Data Mining (DM). Data Mining is the discovery of knowledge from databases by identifying patterns in the data (Shmueli et al., 2017). In this regard, DM is usually part of ML, as ML needs the

patterns identified by DM to create the rules for predicting future behavior (Overgoor et al., 2019). Deep Learning (DL) is a higher level of ML, because it is based on learning algorithms that don't need to be managed manually. DL, taking advantage of Big Data and computing power, makes it possible to decipher and provide the result for a new information instantly (Alpaydin, 2016). Natural language processing (NLP) is one of the applications of ML and DL in the area of speech recognition, allowing the understanding of data regarding its context, vocabulary, syntax and semantic meaning (Alpaydin, 2016).

Finally, how do these concepts relate to marketing? Marketing analysis brings quantitative data that serve as support for decision making. The concepts mentioned above are all the techniques that can help to make better decisions using data. All these terms overlap and interrelate but are distinct by themselves (Overgoor et al., 2019).

2.4 Impact of AI on Digital Marketing

Marketing decision makers are constantly using their experience and instinct to make decisions based on large amounts of data, statistical graphics, opinions and their own taste. Inevitably, such complexity and variety of circumstances turn decision-making into a difficult task for AI (Wirth, 2018). The increasing amount of consumer data available online, on Big Data systems or mobile devices, makes AI an important ally of marketing, as it takes advantage of data in most of its processes - from consumer needs research, market analysis, customer insights and competitor analysis, to measuring the results of adopted strategies (Jarek and Mazurek, 2019).

AI seems to be able to solve the puzzle of how so much information can be processed, produce a low-risk decision in a short period of time (Gkikas and Theodoridis, 2019) and continuously learn from it (Wirth, 2018). But how can AI replace the experience and instinct of marketers? How does this happen in practice? And in what areas of digital marketing? It is important to understand what implications AI can have in marketing practice, as well as verifying which areas of AI find application in marketing (Jarek and Mazurek, 2019).

Marketing professionals are confronted with AI without realizing it, as budgeting for online campaigns, chatbots or digital assistants, for example. AI is still taking its first steps, but it is easy to notice its transformative weight as one of the marketing pillars of the future. This future of AI will not consist of a war between "marketer vs. machine", but of "marketer + machine" - which means that as the world changes and AI is integrated into technology, tools and platforms, human creativity is more valued. Instead of replacing marketers, it allows them to focus more on strategic leadership and less on market assumptions (Olson and Levy, 2018). According to some studies, the results will be tremendous. A research conducted by Accenture predicts that by 2035, AI has the potential to increase economic growth rates by 1.7% across all sectors and increase productivity by up to 40% (Purdy and Daugherty, 2017). At the same time, Gartner projects that by 2020, companies that master AI-based insights will "steal" 1.2 trillion dollars a year from those that do not (McCormick et al., 2016).

Theodoridis and Gkikas (2019) illustrate how AI can influence marketing activities. They argue that firm aims increasing their revenues by optimizing the digital marketing campaigns, channels, audiences and market performances, measuring the impact to customers, revenues and improving customers satisfaction creating personalized content. Artificial Intelligence (AI), data mining, predictive modeling and machine learning tend to satisfy marketers by helping them identify strengths, weaknesses, opportunities, threads, market needs, analyze users and target audiences. Effective and efficient data processing will classify customers' needs, increase ROI, customer satisfaction and driving growth. Artificial Intelligence takes as input data coming from websites, sales, analytic reports, social media insights and process them to produce optimized, accurate, highly predictive results.". This passage defines the objectives of the companies and explains how AI can help in the marketing activities in order to fulfill these objectives and allow better decision making.

With the connection of these two areas (AI and digital marketing), the concept of Marketing AI arises. Overgoor (2019) defines Marketing AI as the development of artificial agents which, given the information they have about consumers, competitors, and the own company, suggest and/or execute marketing actions to reach the best possible outcome. Already today, AI is applied in several methods of digital marketing, so there are several examples of Marketing AI solutions. Through the study of existing literature, it was possible to collect relevant information about the current state of AI solutions in digital marketing. In an attempt to summarize the current state of the topic, the applications of AI in

digital marketing methods and their example solutions are presented below, following the RACE framework already mentioned (Theodoridis and Gkikas, 2019):

Reach:

- **Smart Content Curation** identifies, classifies and suggests content according to data from past experiences. A good example is RankBrain, a component of Google's main algorithm that is constantly classifying search results, helping to process search requests in order to present the most relevant results;
- **Programmatic Advertising** defines target audiences and distributes ads to the most relevant users. The Gupshup platform, for example, sends personalized campaigns to target clients using AI;
- **Content Creation** refers to content creation applications based on target words or phrases, customized and relevant to specific customer groups. A good example is Cortex, which assists in creating optimized content for an audience using AI;
- **Natural Language Processing** increases the reach of customer searches by text, voice, or even commands through digital assistants such as Siri. This more intelligent processing capability of customer searches makes it essential for companies to adapt and use the best SEO techniques. The Atomic Reach platform, for example, optimizes the most important content sentences to generate more conversions.

Act:

- **Propensity Modeling** or Single Customer View collects and processes large amounts of data from past users' actions to predict their behavior. SAS Customer Intelligence 360 provides a 360-degree view of the customer from digital data at the customer level combined with traditional data sources and a deeper understanding of the customer from the incorporation of predictive marketing analysis.
- **Ad Targeting** refers to the prediction and definition of the ads that have the best performance in specific user groups, during the various stages of the customer experience. The Albert AI platform, for example, analyzes data from past ads and customer databases and uses machine learning to target, execute and optimize advertising campaigns.
- **Predictive Analytics** predicts customers' behavior before they start their purchase process. SAS, for example, offers intelligent and automated predictive analysis solutions.
- **Lead Scoring** examines the value of a potential business opportunity and, based on predictive data analysis, ranks its degree of priority. The Cien app, for example, uses AI to see beyond the traditional lead scoring model and also includes a predictive component in its model.

Convert:

- **Dynamic Pricing** identifies potential customers who need an extra reason for conversion. It consists of reducing the price and profit of a product to attract more customers. The Engage360 Remarketing solution from Vizury, for example, uses AI to calculate the optimal offer/price to present to the user at the retargeting phase.
- **Retargeting** or remarketing consists in determining what content can bring customers back to the website, considering the user's profile and their conversion potential. AI allows optimizing remarketing ads and making them as efficient as possible. The Vizury solution mentioned above bases its retargeting on AI technologies that evaluate the user's behavior. Another example is Google Ads Remarketing which allows organizations to display targeted ads for users who have already visited their website.
- **Web and App Personalization** customizes the content and interface of a webpage or app to increase the conversion rate. Evolv, for example, enables greater conversion through personalization of websites or apps and website testing such as A/B testing.
- **Chatbots** answer in a human and natural way to customer questions, suggesting purchases or completing orders. A well-known example is Facebook's Messenger Chatbot that can be included in company websites and help customers in several ways. This process can be done through platforms like Chatfuel.

Engage:

- **Predictive Customer Service** specifies and interacts with customers by approaching them with offers, promotions or suggestions after they complete their purchases, increasing customer connection with the brand. ML-driven predictive analysis can be used to determine which customers are more likely to be inactive or to completely withdraw from the brand. With this insight, it is possible to contact those customers. Einstein from Salesforce, part of the Salesforce Customer 360 platform, is an AI layer that provides such predictions and recommendations based on business processes and customer data.
- **Marketing Automation** categorizes customers and approaches them using optimized content according to the best contact time, the most stimulating phrases and the most relevant offers. Conversica digital sales assistant, for example, helps companies find and convert customers faster and more efficiently by contacting, involving, classifying and automatically tracking leads through natural, multi-channel and bidirectional conversations.
- **Dynamic Emailing** consists in promoting products or services in a personalized way to relevant customers. Seventh Sense, for example, sends marketing emails individually at the optimal time and frequency, according to clients' needs.

It can be observed that the impact of AI in marketing activities is broad. However, the authors Jarek and Mazurek (2019) go even further, and state, according to their analysis, that the impact of AI extends to all areas of the marketing mix. The authors also conclude that, despite the wide applicability of AI in marketing, its identified applications happen more at the operational level, possibly the effect of a careful implementation of the new technology (Raghuram and Singh, 2020), still in an experimental phase, or even due to the uncertainty of its implementation outcome. Jarek and Mazurek (2019) also compiled several examples of solutions for each area of AI - voice processing, word processing, image recognition, decision making, robots and autonomous vehicles - and found application in marketing for all of them.

Davenport (2020), alongside other researchers, suggests a framework for understanding AI and its expected short and long term evolution. In this framework, the author considers three dimensions related to AI: levels of intelligence, type of task and the incorporation or not of AI in a robot. Davenport and Kirby (2016) evaluate the level of intelligence of an AI by contrasting the concepts of "task automation" and "context awareness". Task automation refers to more basic forms of AI - Narrow AI - and more suitable for contexts with clear rules and predictable results, such as chess. Context awareness is a form of intelligence that requires that machines and algorithms "learn to learn" and extend beyond the initial programming done by humans - AGI. Such AI applications can address complex and idiosyncratic tasks, applying holistic thinking and specific responses to the context in question. These capabilities remain distant in the AI landscape, however, they constitute the goal of AI developments, as predicted by convincing examples of science fiction, such as Jarvis, from the Iron Man movies (Huang and Rust, 2018). Type of task refers to applications of AI that analyze numbers or non-numerical data (for example, text, voice, images or facial expressions). These different types of data provide information for decision making, but analyzing numbers is substantially easier than analyzing other types of data (Davenport et al., 2020; Mohd et al., 2021). Finally, the authors also consider the incorporation of AI in a robot for the understanding of the evolution of AI. The authors look at this dimension as a continuous spectrum - Milgram Virtuality-reality continuum (Milgram et al., 1995) - which indicates the degree between a fully virtual AI application and one embedded in a body capable of physically interacting with the real world. Considering these dimensions, Davenport (2020) describes the current state of AI and its probable evolution. Davenport (2020) looks ahead, in the short and medium term, to a further evolution of AI at the level of task automation intelligence, with capabilities for numerical and non-numerical data analysis and with AI applications both virtual and embedded in a robot. The author also examines what might happen when AI applications incorporate context awareness, presenting the challenges and complexity of its application and also the possible benefits of this evolution. According to Davenport (2020) there are no indications that such developments will occur in the short or medium term, thus only foreseeing in the long term and hypothetically the evolution of AI at the level of intelligence of context awareness.

The impact of AI on digital marketing activities was addressed, however, its impact extends beyond marketing and also influences other levels, such as strategy/management, namely: greater predictive capability (Davenport et al., 2020; Shankar, 2018); sales process transformation (Barro and

Davenport, 2019; Singh et al., 2019; Syam and Sharma, 2018); revenue growth (Kumar et al., 2019); personalization and curatorship (Kumar et al., 2019); more creative freedom (Jarek and Mazurek, 2019; Kumar et al., 2019); new ways of interaction (Jarek and Mazurek, 2019; Olson and Levy, 2018); better customer understanding (Olson and Levy, 2018); greater reasoning and decision making capability (Olson and Levy, 2018); task automation (Jarek and Mazurek, 2019); more innovation (Jarek and Mazurek, 2019); development of new skills (Jarek and Mazurek, 2019) and a new marketing ecosystem (Jarek and Mazurek, 2019). In addition, impacts related to customer behavior and political and ethical issues are also expected, which may be a challenge to the implementation of AI (Davenport et al., 2020). Other factors to consider when incorporating AI into a company are: the maturity of the data ecosystem, a prepared organizational structure with skilled professionals, alignment of AI initiatives with the business objectives of the entire organization, and the establishment of clear parameters and control guidelines (Bahador and Haider, 2020; Farah, Bonnet and Damaj, 2020; Kumar et al., 2019).

Another relevant perspective about Digital Marketing process is to really understand why the success or failure occurs. Pereira and Santos (2020) affirms that the unique way to improve a process is concentrated in understand the real causes. According to Pereira et al. (2021) the companies need to explicit their knowledge in a projects and processes oriented to permit a continuous improvement.

3. Methodology

To answer the different questions and research objectives, different methods were followed. First, to determine the main problems, difficulties or needs currently faced by marketing professionals and answer the first research question, a mixed method study was conducted, combining a qualitative approach based on document analysis with online survey using a non-probabilistic sample. The target was defined as digital marketing professionals with over 1 year of professional experience in Portugal. Data collection was carried out between June 23 and July 28 2020 through an online survey applied to web-based groups dedicated to digital marketing and also through direct sharing with professionals presenting profiles with experience in digital marketing in Portugal, on the LinkedIn platform.

Regarding its structure, it was organized into a first part with characterization questions and a second part for exploratory questions concerning different aspects of each of the eight areas of digital marketing, namely: Website/CX; SEO; Content Marketing; Email Marketing; Social Media Marketing; Online Advertising; Communication and Sales; Strategy and Data Analysis. The breakdown of digital marketing according to these areas was defined according to the different areas of action identified in the literature review. This structure allows a greater detail of the questions and also of the conclusions. The characterization questions aimed to collect the profile of the respondent regarding his experience in digital marketing (in years), professional function, size of the employing company and work industry. Apart from profiling the respondent, the first question - experience in digital marketing - allowed filtering the answers. The answers of respondents whose experience was less than a year were not considered because they did not belong to the desired target. The exploratory questions were organized according to the different areas of digital marketing and their purpose was the collection of feedback/opinion of the respondents regarding the different aspects of each area of digital marketing. Each question presents a different aspect of the digital marketing area in question and whose relevance was identified by the review of the existing literature and by the analysis of the solutions mentioned by different authors in the literature review. That is, all the questions presented address an aspect with potential for improvement by the application of AI. In this regard, the respondents' opinion indicates whether improvements in the different aspects of digital marketing are really necessary. Thus, the respondents were asked to evaluate different aspects of the marketing area in question in a matrix of closed-ended questions on a Likert scale of the type:

1. Insufficient or non-existent - it is a critical problem and development is needed
2. Sufficient – it’s a problem and should be developed
3. Good – doesn’t represent a problem, but can be developed
4. Very good - well developed, but there’s room for improvement
5. Excellent - fully developed and not at all a problem

Regarding the scale chosen, as it was intended to evaluate the respondents' opinion about different aspects of marketing, the Likert scale was chosen because it allows questioning on levels of

agreement, approval or importance, providing freedom of adjustment to the problem in question (Allen and Seaman, 2007). The Likert scale allows to discover and measure in a more detailed way the opinion on a specific subject, while maintaining simplicity and speed of response. As evidenced by the existing literature, questions in a Likert scale are effective in collecting points of view, opinions and attitudes towards a given problem, according to the dimensions relevant to the purpose of the survey (Brown, 2001). In this particular research, the purpose was to evaluate the opinion concerning the level of development of the different aspects of digital marketing, and the defined dimensions (Insufficient or non-existent - Excellent) allow to meet this purpose. The organization of the questions in a matrix was selected because it allows to simplify situations in which there is a lot of content, as it was the case.

Next, in order to answer the second research question - Which AI technological solutions with applicability in the different areas of digital marketing currently exist in the global market and what are their features? - the gathering of solutions was conducted. In this research, and in a similar perspective to the work developed by Jarek and Mazurek (2019), a methodology of research of secondary data sources in marketing portals was followed, alongside the validation of the selected examples in the websites of the companies responsible for the applications. Two of the secondary data sources considered were the articles by Theodoridis and Gkikas (2019) and Jarek and Mazurek (2019) whose examples of solutions are found in the literature review. Three solutions were researched and collected for each of the eight areas of digital marketing. The main criteria were the applicability to each area of digital marketing and the extent of the offered features with embedded AI - greater importance was given to the most complete solutions, with a larger number of features with AI. The analysis of these solutions involved the determination of their general purpose and features with and without embedded AI.

Finally, to assess the potential impact of applying AI in digital marketing and to answer the last two research questions - "What level of coverage do AI solutions offer to the overall needs of marketing professionals? What is the most complete solution?" and "Which solutions best respond to the specific identified problems?" - the analysis of the survey's collected data was conducted using IBM SPSS Statistics 26 and Microsoft Excel, with subsequent coverage analysis of the solutions regarding the variables evaluated and match analysis between the variables with the worst scores and the solutions with response features. This coverage and match analysis allowed to suggest and inform digital marketing professionals about the most complete solutions for each area and those that allow them to solve their specific and more critical needs.

4. Results and Discussion

In this section the answers to the research questions will be presented. The results of the analysis will be discussed and interpreted in comparison with the literature review.

4.1. Main problems, difficulties or needs that digital marketing professionals face today

In order to answer this question, a survey addressed to digital marketing professionals was developed, to identify the main problems, difficulties or needs in their profession. In this survey, respondents were asked to evaluate different aspects of digital marketing on a Likert scale (1 - Insufficient or Inexistent to 5 - Excellent). The main goal was to identify the items that obtained the worst score in each area of digital marketing, as it is in these variables that there is a greater opportunity to generate benefits with the application of Artificial Intelligence.

The final sample was composed by 121 digital marketing professionals. In cleaning the data, the exclusion criteria involved experience below the minimum required (less than 1 year), duplicate cases and cases with invalid responses (missing, incorrect or repeated values). From the final sample it was possible to analyze the main characteristics through a frequency analysis. The great majority of the respondents have more than two years of experience in digital marketing, 38.8% have been working for about 2-5 years and 38.8% have been working for more than 5 years, with a lower percentage of 22.3% working only for about 1-2 years in the area. The professional function that is more represented is the one of consultant for another company (40.5%), followed by the functions of technician for the own company (31.4%) and marketing manager (26.4%), respectively. The different company

dimensions are represented in a balanced way – Micro enterprise (25.6%), Small enterprise (27.3%), Medium-sized enterprise (25.6%) and Large enterprise (21.5%). Finally, the respondents are spread across several industries, with the most represented being Consulting/Research Services (33.9%), Retail (14%) and Information and Communication (9.9%). Still regarding the respondents' experience, more specifically in each one of the areas of digital marketing approached, they revealed more inexperience in the areas of Communication and Sales (62.8%: 53.7% without experience and 9.1% with less than 1 year of experience), Email Marketing (38.9%: 21.5% without experience and 17.4% with less than 1 year of experience) and SEO (31.4%: 14% without experience and 17.4% with less than 1 year of experience). On the other hand, they present more experience in the areas of Social Media Marketing (66.9%: 28.9% with more than 5 years of experience and 38% between 2 and 5 years), Content Marketing (60.3%: 26.4% with more than 5 years of experience and 33.9% between 2 and 5 years) and Website/CX (57.8%: 31.4% with more than 5 years of experience and 26.4% between 2 and 5 years). Considering the final sample size of 121 digital marketing professionals and the total size of the population of professionals in this field of activity - other consulting, scientific and technical activities - in Portugal of 39770 employees (PORDATA, 2018), a 8.9% margin of error was calculated for the sample (for a 95% confidence level).

In order to answer the research question, the evaluation variables were analyzed according to their average, percentage of negative scores (Insufficient or non-existent, or Sufficient) and percentage of positive scores (Very good or Excellent). In determining the variables with the worst scores, the three variables with the worst average and whose percentage of negative scores was higher than the percentage of positive scores were selected. Thus, including the average, the general opinion regarding the variable was considered. On the other hand, the second criterion prevented variables with a higher percentage of positive scores rather than negative (even with a low average) from being analyzed as "worst ranked", because in reality they obtained a more positive than negative rating. This could happen when even in the top 3 of the worst rating averages, there were variables with a positive average rating. Finally, a comparative analysis was also conducted between the overall scores obtained for the different areas of digital marketing. The results of this analysis for each area of digital marketing and the respective interpretations are presented below.

Table 1. *Analysis of the obtained scores for the variables in the Website/CX area.*

Website/CX Variables	Average	Negative Scores	Positive Scores
6.1 Personalization	2.78	44.6%	32.6%
6.2 Search	2.97	39.1%	37.0%
6.4 Tracking Automation	3.21	34.8%	41.3%
6.3 Tracking	3.60	19.6%	54.4%
Overall	3.14	34.5%	41.3%

Source: online survey developed by the author

In the Website/CX area (Table 1), the variables with the worst scores were the personalization of the website experience to the customer (6.1 Personalization) and website search optimization (6.2 Search), with a lower average (2.78 and 2.97, respectively) and a higher percentage of negative than positive scores. According to a large part of the respondents (between 39.1% and 44.6%), these two items represent a problem and should be developed. It's in these aspects that there is a greater potential to generate benefits with the application of AI, since, as presented in the literature review, there are applications of AI both for search optimization (Olson and Levy, 2018; Rajanarthagi, 2019; Theodoridis and Gkikas, 2019) and for personalization of the website experience (Kumar et al., 2019; Theodoridis and Gkikas, 2019). Some of the mentioned examples involve the use of natural language processing (Theodoridis and Gkikas, 2019) and semantic search (Rajanarthagi, 2019) for intelligent searches, and the personalization of websites and apps with A/B testing for a better customer experience (Rajanarthagi, 2019; Theodoridis and Gkikas, 2019). Overall, the Website/CX area obtained a positive score with an average of 3.14 and a higher rate of positive than negative responses.

Table 2. *Analysis of the obtained scores for the variables in the SEO area.*

SEO Variables	Average	Negative Scores	Positive Scores
9.5 Waiting for Updates	2.57	49.4%	22.9%
9.6 Forecasting / Simulation	2.63	48.2%	27.7%
9.10 Execution Automation	2.73	42.7%	34.1%
9.9 Adaptation	2.80	42.2%	25.3%
9.4 Transparency	2.92	36.1%	39.8%
9.7 Analysis Automation	2.93	41.0%	36.1%
9.8 Support	2.99	34.9%	32.5%
9.3 Research Automation	3.02	31.3%	33.7%
9.12 Tracking Automation	3.02	37.3%	38.6%
9.2 Competition Research	3.13	27.7%	37.3%
9.11 Tracking	3.17	32.5%	45.8%
9.1 Audience Research	3.34	18.3%	41.5%
Overall	2.94	36.8%	34.6%

Source: online survey developed by the author

In the SEO area (Table 2), the items that obtained the worst scores were the need to wait for the rankings to be updated in order to know the results of the optimizations (9.5), the ability to previously test/simulate the optimizations (9.6) and the automation of the execution of SEO actions (9.10), with a lower average (2.57, 2.63 and 2.73, respectively) and a higher percentage of negative scores than positive ones. According to a large number of respondents (between 42.7% and 49.4%), these aspects represent a problem and should be developed. During the review of the existing literature it was not possible to identify such applications of AI specifically for SEO, however several authors address both the predictive capability of AI (Overgoor et al., 2019; Rajanarthagi, 2019; Shankar, 2018) and its potential for task automation (Davenport et al., 2020). The potential of AI to solve the identified problems is visible, however, it is important to verify the existence of such solutions in the market. Overall, the SEO area obtained a negative rating with an average of 2.94 and a higher rate of negative than positive responses.

Table 3. *Analysis of the obtained scores for the variables in the Content Marketing area.*

Content Marketing Variables	Average	Negative Scores	Positive Scores
12.8 Personalization Automation	2.59	48.0%	21.4%
12.5 Planning Automation	2.67	50.0%	25.5%
12.10 Optimization Automation	2.73	44.4%	26.3%
12.2 Research Automation	2.85	40.4%	31.3%
12.13 Distribution Automation	2.96	38.8%	34.7%
12.7 Personalization	2.97	36.4%	29.3%
12.9 Optimization	2.97	35.4%	36.4%
12.6 Creation Speed	3.06	34.3%	33.3%
12.3 Planning Speed	3.09	34.3%	35.4%
12.4 Data Use	3.12	32.0%	39.2%
12.1 Research Speed	3.16	26.3%	35.4%
12.11 Distribution	3.17	31.3%	40.4%
12.12 Distribution Optimization	3.17	28.3%	37.4%
Overall	2.96	36.9%	32.8%

Source: online survey developed by the author

In the area of Content Marketing (Table 3), the items that obtained the worst scores were the automation of content personalization (12.8), the automation of content planning (12.5) and the automation of content optimization (12.10), with a lower average (2.59, 2.67 and 2.73, respectively) and a higher percentage of negative than positive scores. A large number of professionals (between 44.4% and 50%) rated these aspects as a problem with development needs. It's observed that all the items that refer to the automation of content marketing processes are at the top of the table, with the

worst average score. It can be concluded that professionals consider that there is a need for development in the area of content marketing, especially with regard to the automation of its processes. In the literature review several authors address capabilities of the AI that allow to respond to these problems, namely the ability to automate tasks (Davenport et al., 2020; Jarek and Mazurek, 2019; Kumar et al., 2019) and to improve processes such as content creation and curation (Rajanarthagi, 2019; Theodoridis and Gkikas, 2019). Overall, the Content Marketing area obtained a negative score with an average of 2.96 and a higher rate of negative than positive responses.

Table 4. *Analysis of the obtained scores for the variables in the Email Marketing area.*

Email Marketing Variables	Average	Negative Scores	Positive Scores
15.5 Personalization Automation	2.77	47.3%	31.1%
15.3 Optimization Automation	2.81	51.4%	35.1%
15.4 Personalization	3.19	32.4%	44.6%
15.6 Email Automation Mechanisms	3.22	35.6%	45.2%
15.1 Data Use	3.32	32.4%	43.2%
15.2 Optimization	3.41	25.7%	45.9%
Overall	3.12	37.5%	40.9%

Source: online survey developed by the author

In the area of Email Marketing (Table 4), the variables of automation of the personalization to the audience (15.5) and automation of the optimization of email contents (15.3) appear highlighted as worst ranked, with a lower average (2.77 and 2.81 respectively) and a higher percentage of negative rather than positive scores. About half of the professionals thus consider that there is a need to develop the automation of the processes of personalization and optimization in email marketing. In the reviewed literature, several authors address the potential of the application of AI in email marketing, specifically regarding the ability to automate processes (Alexander, 2019) and a higher level of personalization and optimization with dynamic emailing (Theodoridis and Gkikas, 2019). Overall, the Email Marketing area obtained a positive rating, with an average of 3.12 and a higher rate of positive than negative responses.

Table 5. *Analysis of the obtained scores for the variables in the Social Media Marketing area.*

Social Media Marketing Variables	Average	Negative Scores	Positive Scores
18.9 Optimization Automation	2.82	42.2%	29.4%
18.7 Personalization Automation	2.94	37.9%	33.0%
18.5 Planning Automation	2.95	37.9%	36.9%
18.2 Research Automation	2.98	37.9%	31.1%
18.14 Competition Monitoring Automation	2.99	36.9%	36.9%
18.8 Optimization	3.14	32.4%	40.2%
18.12 Distribution Automation	3.15	35.3%	45.1%
18.16 Tracking Automation	3.16	30.4%	39.2%
18.1 Research Speed	3.24	26.2%	39.8%
18.6 Personalization	3.25	25.2%	39.8%
18.10 Distribution	3.28	24.0%	43.0%
18.13 Competition Monitoring	3.35	25.2%	48.5%
18.3 Data Use	3.39	25.2%	44.7%
18.11 Distribution Optimization	3.42	21.8%	48.5%
18.4 Planning Speed	3.43	20.4%	48.5%
18.15 Tracking	3.50	23.8%	51.5%
Overall	3.19	30.2%	41.0%

Source: online survey developed by the author

In the area of Social Media Marketing (Table 5), the variables of content optimization automation (18.9), personalization automation (18.7) and planning automation (18.5) appear highlighted as worst

ranked, with lower average (2.82, 2.94 and 2.95 respectively) and with a higher percentage of negative rather than positive ratings. Again, it is possible to observe that at the top of the items with the worst scores appear the variables related to process automation. A large percentage of professionals (between 37.9% and 42.2%) thus considers that there should be development in the automation of social media marketing processes. In the literature review no solutions were identified that could specifically respond to these aspects, however, several authors mention the potential of AI to solve these problems with the ability to automate tasks (Alexander, 2019; Davenport et al., 2020; Jarek and Mazurek, 2019; Kumar et al., 2019). Apart from identifying this potential, as already mentioned, it is more important to identify existing solutions in the market that allow a concrete response to these problems. Overall, the Social Media Marketing area obtained a positive score with an average of 3.19 and a higher rate of positive than negative responses.

Table 6. *Analysis of the obtained scores for the variables in the Online Advertising area.*

Online Advertising Variables	Average	Negative Scores	Positive Scores
21.2 Forecasting	3.07	33.0%	34.1%
21.5 Execution Automation	3.11	37.5%	38.6%
21.4 Personalization Automation	3.19	30.7%	40.9%
21.1 Creation Automation	3.25	29.5%	42.0%
21.6 Support	3.25	29.5%	45.5%
21.7 Tracking Automation	3.33	31.0%	48.3%
21.3 Personalization	3.40	27.3%	51.1%
Overall	3.23	31.2%	42.9%

Source: online survey developed by the author

In the Online Advertising area (Table 6), all items obtained a positive rating, with a positive response rate higher than negative. The values observed for the percentages of negative and positive ratings indicate that for all items, most professionals consider that they do not represent a problem and that they are well developed. The online advertising area may thus be one of the most developed and where no problems are identified, however it is important to compare the results obtained. Among the variables with the worst scores, the ability to predict the performance of campaigns (21.2) and the variables related to the automation of the execution and personalization processes (21.5, 21.4) stand out. The literature review identified the potential of AI to solve these problems, specifically the ability to forecast for better allocation of advertising resources (Davenport et al., 2020; Theodoridis and Gkikas, 2019) and the ability to automate campaigns (Theodoridis and Gkikas, 2019). Overall, the Online Advertising area obtained a positive rating with an average of 3.23 and a higher rate of positive than negative responses.

Table 7. *Analysis of the obtained scores for the variables in the Communication and Sales area.*

Communication and Sales Variables	Average	Negative Scores	Positive Scores
24.7 Interaction Automation	2.69	44.4%	24.4%
24.9 Optimization	2.78	46.7%	31.1%
24.4 Lead Qualification Automation	2.84	46.7%	35.6%
24.8 Personalization	2.93	42.2%	35.6%
24.6 Lead Management Automation	2.93	38.6%	31.8%
24.5 Lead Management	2.96	35.6%	31.1%
24.10 Learning	2.96	31.1%	28.9%
24.3 Lead Qualification	3.07	37.8%	33.3%
24.2 Acquisition / Follow-up Automation	3.09	28.9%	33.3%
24.1 Acquisition / Follow-up	3.31	24.4%	44.4%
Overall	2.96	37.6%	33.0%

Source: online survey developed by the author

In the area of Communication and Sales (Table 7), the variables for automation of the interaction with leads (24.7), optimization of the interactions (24.9) and automation of lead qualification (24.4)

stand out as the worst ranked, with a lower average (2.69, 2.78 and 2.84 respectively) and a negative response rate higher than the positive response rate. Moreover, it is observed that many variables present a negative score, which indicates that the area of communication and sales has a great potential for improvement with the application of AI. A large part of the professionals (between 31.1% and 46.7%) considers that the majority of the communication and sales aspects represent a problem and should be developed. The literature review showed that several authors approach this potential of AI application in the transformation of communication and sales processes (Barro and Davenport, 2019; Singh et al., 2019; Syam and Sharma, 2018), mainly through automation and optimization (Rajanarthagi, 2019; Theodoridis and Gkikas, 2019). Some of the AI applications mentioned include communication automation, predictive customer support, chatbots and lead scoring (Theodoridis and Gkikas, 2019). Overall, the Communication and Sales area obtained a negative rating with an average of 2.96 and a higher rate of negative than positive responses.

Table 8. *Analysis of the obtained scores for the variables in the Strategy and Data Analysis area.*

Strategy and Data Analysis Variables	Average	Negative Scores	Positive Scores
27.4 Forecasting	2.91	32.6%	27.9%
27.3 Automation	3.12	32.9%	43.5%
27.6 Use of Predictive Data	3.12	34.1%	41.2%
27.1 Analysis Speed	3.35	24.4%	46.5%
27.2 Knowledge	3.43	24.4%	55.8%
27.5 Use of Historical Data	3.53	22.1%	55.8%
Overall	3.24	28.4%	45.1%

Source: online survey developed by the author

In the area of Strategy and Data Analysis (Table 8), only the variable related to the ability to predict events/actions and behaviors (27.4) presents a negative score, with a lower average (2.91) and a higher rate of negative than positive responses. A large part of the respondents (32.6%) considers that the ability to predict should be developed. The forecasting ability is one of the most important aspects when talking about AI and several authors approach this factor as a driver of the reasoning and decision making capability of organizations (Olson and Levy, 2018), allowing the identification/prediction of market trends (Jarek and Mazurek, 2019; Kumar et al., 2019; Shankar, 2018) and client behaviors (Rajanarthagi, 2019; Theodoridis and Gkikas, 2019). Overall, the area of Strategy and Data Analysis obtained a positive score with an average of 3.24 and a higher rate of positive than negative responses.

Table 9. *Analysis of the overall scores obtained for the digital marketing areas.*

Digital Marketing Areas	Average	Negative Scores	Positive Scores
SEO	2.94	36.8%	34.6%
Communication and Sales	2.96	37.6%	33.0%
Content Marketing	2.96	36.9%	32.8%
Email Marketing	3.12	37.5%	40.9%
Website/CX	3.14	34.5%	41.3%
Social Media Marketing	3.19	30.2%	41.0%
Online Advertising	3.23	31.2%	42.9%
Strategy and Data Analysis	3.24	28.4%	45.1%
Overall	3.09	33.8%	38.3%

Source: online survey developed by the author

The analysis of the overall scores for each area allows to have an idea of those that most need development. It's noticed that the areas of SEO, Communication and Sales, and Content Marketing are those that present a worse overall score, with lower averages (2.94, 2.96 and 2.96 respectively) and a higher rate of negative than positive scores (Table 9). It was in these areas that digital marketing professionals identified more aspects that represent a problem and need development. Therefore, it's in these areas that there is the most potential to generate benefits with the application of AI. As already

mentioned in the analysis of these areas, the literature review revealed the potential of applying AI in its different processes. Among the different factors with potential to revolutionize these areas of digital marketing, one can highlight the predictive ability that can transform the execution of SEO (Overgoor et al., 2019; Rajanarthagi, 2019; Shankar, 2018), the ability to enhance communication through new ways of interaction (Olson and Levy, 2018) and transformation of the sales process (Singh et al., 2019; Syam and Sharma, 2018), and the ability to leverage a more personalized and automated content marketing that enables creative freedom (Jarek and Mazurek, 2019; Kumar et al., 2019). There was also a tendency for a worse ranking of variables related to process automation. The literature review revealed the potential that the application of AI can have in this regard. The automation of processes and tasks was the most highlighted capability of AI by the authors. In addition, the expected evolution of AI meets this aspect. Davenport (2020) prospects, in the short and medium term, a further evolution of AI at the level of intelligence of task automation, providing digital marketing professionals with analytical, predictive and automation capabilities that were previously not possible, and allowing a deep understanding of customer behavior, enabling unparalleled levels of optimization and personalization. Overall, the score obtained for all areas and for digital marketing in general was positive, with an average of 3.09 and a higher rate of positive than negative ratings. Therefore, it can be observed that a large part of the respondents (38.3%) are satisfied with the level of development of digital marketing and its different areas.

4.2. AI technological solutions applicable in the different areas of digital marketing

To answer this question, a research was conducted on the technological solutions of AI with applicability in digital marketing, existing in the global market. In this research, and in a similar perspective to the work developed by Jarek and Mazurek (2019), a methodology of research of secondary data sources in marketing portals was followed, alongside the validation of the selected examples in the websites of the companies responsible for the solutions. The gathered solutions were organized according to their area of applicability in digital marketing, namely: Website/CX; SEO; Content Marketing; Email Marketing; Social Network Marketing; Online Advertising; Communication and Sales; Strategy and Data Analysis. This research included the analysis of the solutions regarding their general purpose and features with and without built-in AI. The collected solutions are: Recommendations AI (Google Cloud); Bloomreach Experience Cloud; LiftIgniter; Market Brew; Alli AI; Can I Rank; Atomic Reach; Concured; Stackla; Automizy; Persado Pro Email; Mercanto; Cortex; Rocco; Unmetric; Albert AI; Acquisio Turing; Adobe Advertising Cloud; Automat; Conversica; Drift Automation; SAS Visual Data Mining and Machine Learning; SAS Visual Forecasting; Document AI (Google Cloud). The detailed results of this research are presented in the appendix (tables Table **19**; Table **20**; Table **21**; Table **22**; Table **23**; Table **24**; Table **25**; Table **26**).

4.3. Level of coverage that AI solutions offer in relation to the general needs of marketing professionals

In order to answer this question, an analysis of the coverage of the solutions and features identified was conducted, regarding the aspects of digital marketing evaluated in the survey. The goal was to determine the most complete solution for each digital marketing area, considering the features with built-in AI.

Table 10. *Coverage matrix of the AI solutions for the Website/CX area.*

Website/CX	Google Cloud Recommendations AI (Google Cloud)	bloomreach Experience Cloud	LiftIgniter
6.1 Personalization	✓	✓	✓
6.2 Search		✓	
6.3 Tracking	✓	✓	✓
6.4 Tracking Automation	✓	✓	✓
Total	3/4	4/4	3/4

Source: author

For the Website/CX area, the solutions found cover the variables in question in a similar way (Table 10). However, the most complete and best suited to meet the needs identified for this area is the Bloomreach Experience Cloud solution. Bloomreach Experience Cloud is a digital experience delivery platform, dedicated to companies to create, extend, customize, analyze, test and optimize their digital experiences across all their channels. This solution makes use of the embedded AI in some of its features, allowing it to cover all the variables analyzed and to answer the needs identified for the Website/CX area. Besides the features with built-in AI, this solution is also the one with the widest range of features (with or without AI) among the analyzed solutions. In addition to offering the tools to support the creation of digital experiences, it uses AI for the automatic collection and analysis of user activity data. As introduced by Olson and Levy (2018), AI is positioned to bridge the gap between large amounts of data and extraction of valuable insights, which is found in this solution. The insights that this solution offers enable a greater understanding of the customer and enhance the reasoning and decision making capability, benefits of the AI application that Olson and Levy (2018) highlight in their article. Furthermore, these AI-based insights enable personalization and curation on a scale that goes far beyond human capabilities, with customized content and products offered in real time to each visitor, through the precise matching of customer preferences with the presented offer (e.g. products, recommendations, search results, etc.), a benefit of the AI application highlighted by Kumar et al. (2019). Additionally, this solution offers intelligent search powered by AI, an AI capability also mentioned by several authors (Olson and Levy, 2018; Rajanarthagi, 2019; Theodoridis and Gkikas, 2019). Finally, as introduced by Jarek and Mazurek (2019), this solution allows the elimination of laborious and time-consuming activities through the automation of processes, such as the collection and analysis of client activity data or performance tracking.

Table 11. *Coverage matrix of the AI solutions for the SEO area.*

SEO	marketbrew	Alli AI	Can I Rank?
9.1 Audience Research	✓	✓	✓
9.2 Competition Research	✓		✓
9.3 Research Automation		✓	✓
9.4 Transparency	✓		
9.5 Waiting for Updates	✓		
9.6 Forecasting / Simulation	✓		
9.7 Analysis Automation	✓	✓	✓
9.8 Support	✓	✓	✓
9.9 Adaptation		✓	
9.10 Execution Automation		✓	
9.11 Tracking		✓	✓
9.12 Tracking Automation		✓	✓
Total	7/12	8/12	7/12

Source: author

The analyzed solutions for the SEO area cover the different aspects in a similar way(Table 12). However, the Alli AI solution reveals to be the most complete. Alli AI is a support platform for the management of SEO operations with embedded AI, and its features with AI comprise a large part of the analyzed SEO aspects. Its features with embedded AI involve the automation of processes such as keyword analysis, execution and recommendation of optimizations, adaptation to changes in the search engine algorithms, and tracking of traffic and rankings. The automation of routine or repetitive activities is one of the benefits highlighted by Jarek and Mazurek (2019), simplifying and accelerating processes and freeing professionals for more complex activities. Additionally, the support this solution offers, with a step-by-step SEO strategy planning and optimization recommendations, enhanced by the AI, as highlighted by Olson and Levy (2018), allows supporting and enhancing the decision making capability of marketers, even allowing them to automate the reasoning and decision making steps, going directly to execution.

Table 12. *Coverage matrix of the AI solutions for the Content Marketing area.*

Content Marketing	atomic reach	concured	Stackla
12.1 Research Speed	✓	✓	✓
12.2 Research Automation	✓	✓	✓
12.3 Planning Speed		✓	✓
12.4 Data Use	✓	✓	✓
12.5 Planning Automation		✓	✓
12.6 Creation Speed	✓	✓	
12.7 Personalization	✓	✓	
12.8 Personalization Automation	✓	✓	
12.9 Optimization	✓	✓	✓
12.10 Optimization Automation	✓	✓	
12.11 Distribution		✓	✓
12.12 Distribution Optimization			
12.13 Distribution Automation		✓	
Total	8/13	12/13	7/13

Source: author

Regarding Content Marketing, the most complete solution is the Concured platform (Table 12). Concured is a content strategy platform that uses AI to analyze the content consumed by the audience and determine the factors that cause more engagement, suggesting the creation of optimized content customized for the target audience. This solution covers the phases of research, planning, creation (personalization and optimization) distribution of content, thus allowing responding to the vast majority of the evaluated aspects for content marketing. Its features encompass the several benefits of the inclusion of AI mentioned in the literature review, that is, a greater knowledge of the client and superior reasoning and decision making capability (Olson and Levy, 2018) with the automatic gathering of insights, more creative freedom and improved accuracy of analysis (Jarek and Mazurek, 2019; Kumar et al., 2019) with the automation of tasks such as market research, and a higher level of personalization, curatorship and optimization (Kumar et al., 2019) with the intelligent creation of a marketing brief based on the collected insights and automatically customized content recommendations and CTAs.

Table 13. *Coverage matrix of the AI solutions for the Email Marketing area.*

Email Marketing	automizy	[PERSADO]	mercanto
15.1 Data Use	✓	✓	✓
15.2 Optimization	✓	✓	
15.3 Optimization Automation	✓	✓	
15.4 Personalization	✓		✓
15.5 Personalization Automation	✓		✓
15.6 Email Automation Mechanisms	✓		✓
Total	6/6	3/6	4/6

Source: author

It can be observed that the most complete solution that best covers the needs of email marketing is Automizy (Table 13). Automizy is an email marketing software designed to increase the opening rate of emails. It offers several email marketing tools, some of them enhanced with its AI, Mizy. This solution's features with embedded AI allow to cover all aspects analyzed for email marketing. The offer of this solution meets the benefits of the AI application mentioned in the literature review. The website behavior tracking feature provides a deep knowledge of the customer, an impact of AI highlighted by Olson and Levy (2018). The email automation mechanisms such as the automatic resending of emails, allow professionals to free themselves from routine and repetitive activities, as mentioned by Jarek and Mazurek (2019). The features of automatic optimization and personalization of emails according to collected data and customer preferences, allow to deliver a better experience, with a higher level of personalization and optimization, as stated by Kumar et al. (2019) and Theodoridis and Gkikas (2019).

Table 14. *Coverage matrix of the AI solutions for the Social Media Marketing area.*

Social Media Marketing	CORTEX	ROCCO	unmetric
18.1 Research Speed	✓	✓	✓
18.2 Research Automation	✓	✓	✓
18.3 Data Use	✓	✓	✓
18.4 Planning Speed	✓	✓	
18.5 Planning Automation	✓	✓	
18.6 Personalization	✓	✓	
18.7 Personalization Automation	✓	✓	
18.8 Optimization	✓		
18.9 Optimization Automation	✓		
18.10 Distribution	✓		
18.11 Distribution Optimization	✓		
18.12 Distribution Automation	✓		
18.13 Competition Monitoring	✓		✓
18.14 Competition Monitoring Automation	✓		✓
18.15 Tracking		✓	✓
18.16 Tracking Automation		✓	✓
Total	14/16	9/16	7/16

Source: author

Among the solutions identified for social media marketing, the most complete and that best covers the needs of this area is the Cortex platform (Table 14). Cortex is a social media content optimization platform dedicated to marketing professionals and agencies to continuously improve the engagement of their publications. It supports the creation and planning of campaigns, optimization and personalization of content and its delivery. This solution's features with built-in AI allow it to answer the vast majority of aspects identified for social media marketing. Its features with AI include gathering market insights, automation of content research and planning, personalization to the audience and optimization of content and its delivery. All of these are enhanced by the incorporation of AI and generate benefits that meet those mentioned in the literature review, respectively: superior capability to reason and understand the client and the market (Olson and Levy, 2018), elimination/simplification of laborious and time-consuming activities (Jarek and Mazurek, 2019), and a higher level of content personalization (Kumar et al., 2019). Regarding the optimization of content and its delivery, AI contributes with its capability to analyze large amounts of data and to forecast the content characteristics or the schedules that generate better engagement.

Table 15. *Coverage matrix of the AI solutions for the Online Advertising area.*

Online Advertising	albert	ACQUISIO	Adobe Advertising Cloud
21.1 Creation Automation	✓		
21.2 Forecasting		✓	✓
21.3 Personalization	✓		✓
21.4 Personalization Automation	✓		✓
21.5 Execution Automation	✓	✓	✓
21.6 Support	✓	✓	✓
21.7 Tracking Automation	✓		✓
Total	6/7	3/7	6/7

Source: author

In the Online Advertising area two solutions stand out: Albert AI and Adobe Advertising Cloud (Table 15). These solutions cover the same number of aspects of online advertising. Albert is a self-learning solution that processes and analyzes data on a large scale, autonomously allocating budgets and continuously optimizing evolving campaigns in paid advertising channels, such as search (e.g. Google Search), social media (e.g. Facebook) and programmatic advertising (e.g. YouTube). Adobe

Advertising Cloud is a platform for programmatic advertising management. Powered by Adobe Sensei, Adobe's artificial intelligence, it supports the planning, purchase, management and optimization of ads for better performance and resource allocation, in a single platform. Both solutions cover most aspects analyzed for online advertising, however what distinguishes them is the ability of the Albert AI solution for automatic campaign creation and the ability of Adobe Advertising Cloud to forecast the performance of planned campaigns. Both solutions enable high personalization and segmentation of campaigns, a benefit highlighted by Theodoridis and Gkikas (2019) in the literature review, with the exemplification of AI applications such as ad targeting and programmatic advertising. In addition, both offer campaign execution support, allowing the automation of budget allocation and ad bidding with constant optimization. These features are enhanced by the ability of AI to reason over large amounts of data and predict patterns invisible to the human eye, benefits of applying AI mentioned in the literature review (Davenport et al., 2020; Olson and Levy, 2018). Finally, both offer automatic tracking of campaign performance, freeing marketing professionals from this arduous process. A benefit of applying AI highlighted by Jarek and Mazurek (2019).

Table 16. *Coverage matrix of the AI solutions for the Communication and Sales area.*

Communication and Sales	AUTOMAT	conversica	DRIFT
24.1 Acquisition / Follow-up		✓	
24.2 Acquisition / Follow-up Automation		✓	
24.3 Lead Qualification	✓	✓	✓
24.4 Lead Qualification Automation	✓	✓	✓
24.5 Lead Management		✓	✓
24.6 Lead Management Automation		✓	✓
24.7 Interaction Automation	✓	✓	✓
24.8 Personalization	✓	✓	✓
24.9 Optimization	✓		✓
24.10 Learning		✓	✓
Total	5/10	9/10	8/10

Source: author

Among the identified solutions for the Communication and Sales area, the most complete and the one that best covers the different aspects of this area is Conversica (Table 16). Conversica is a platform of artificial sales assistants (with embedded AI) that help companies to find and retain customers in a faster and more efficient way, contacting, interacting, qualifying and automatically following up leads through natural, multichannel and bidirectional conversations. This solution covers the vast majority of the identified needs. Although its customization power is smaller than the other solutions, Conversica is distinguished by its ability to acquire and follow-up customers, a very important feature that the other solutions do not present. The features that this solution offers meet some impacts expected by several authors, on the application of AI in marketing. As some authors highlight, this solution enables new ways of interaction (Olson and Levy, 2018) and the transformation of the sales process (Singh et al., 2019; Syam and Sharma, 2018), with the acquisition contact, interaction and follow-up through artificial agents. Another benefit of this feature is the superior convenience, with constant availability for customer support, an impact mentioned by Jarek and Mazurek (2019). The automation capability of AI mentioned by several authors is also present in this solution, with the automation of the processes of acquisition/follow-up, interaction, qualification and management of leads. As Jarek and Mazurek (2019) highlight, AI allows the automation of routine and repetitive activities, freeing marketers for more complex or priority processes. A major benefit for the area of communication and sales is the targeting of leads with more potential for human agents, preventing them from wasting time on potential-free leads and enabling superior productivity and efficiency. Finally, the feature of gathering insights in real time provides a deeper knowledge of the customer (Olson and Levy, 2018), and serves as a knowledge base for a more personalized interaction by artificial agents. This solution encompasses some of the AI applications mentioned by Theodoridis and Gkikas (2019), such as communication automation, predictive customer support, chatbots and lead scoring.

Table 17. *Coverage matrix of the AI solutions for the Strategy and Data Analysis area.*

Strategy and Data Analysis	SAS VISUAL DATA MINING AND MACHINE LEARNING	SAS VISUAL FORECASTING	Google Cloud Document AI
27.1 Analysis Speed	✓	✓	✓
27.2 Knowledge	✓	✓	✓
27.3 Automation	✓	✓	✓
27.4 Forecasting	✓	✓	
27.5 Use of Historical Data	✓		✓
27.6 Use of Predictive Data	✓	✓	
Total	6/6	5/6	4/6

Source: author

Among the identified solutions for the Strategy and Data Analysis area, SAS Visual Data Mining and Machine Learning presents a higher level of coverage, however, it is important to distinguish the purposes the different solutions (Table 17). SAS Visual Data Mining and Machine Learning is a software to support data analysis. It supports the complete DM and ML process, both with a visual and a programming interface. It provides the analysis team members of any level of experience with a simple, powerful and automated way to handle all tasks in the analysis life cycle. SAS Visual Forecasting is a forecasting ecosystem to quickly and automatically produce a large number of reliable predictions. The most complete solution that best meets the identified needs for strategy and data analysis is SAS Visual Data Mining and Machine Learning which provides a more robust platform for data analysis. However, if the goal is to increase the ability to predict events/actions and behaviors, the indicated solution is SAS Visual Forecasting, since this is the purpose of this solution. The features of these solutions meet some of the expected impacts with the application of AI, mentioned by several authors. The automation of the analysis through the incorporation of AI boosts the predictive capability (Shankar, 2018) and improves the reasoning and decision making of organizations (Olson and Levy, 2018), allowing the identification/prediction of market trends (Jarek and Mazurek, 2019; Kumar et al., 2019; Shankar, 2018) and customer behaviors (Rajanarthagi, 2019; Theodoridis and Gkikas, 2019).

4.4. Solutions that best respond to the specific identified problems

Having gathered the opinion of marketing professionals regarding the different aspects of digital marketing and also the existing solutions in the market, it makes perfect sense to concretely match the identified problems or needs with the best solutions. To answer this question, a match analysis was conducted between the aspects of each area of digital marketing that obtained the worst scores and the solutions and respective features that allow answering these aspects. The analysis of the variables' average scores presented at the beginning of this chapter resulted in the identification of the worst ranked variables for each area. The existing solutions and their features were also analyzed. The match analysis considered not only the solutions with response features, but also the overall level of coverage of the solutions, i.e., greater importance was given to the solutions with the highest overall coverage.

Regarding the area of Website/CX, the aspects of personalization of the website experience to the customer (6.1) and website search optimization (6.2) obtained a negative score from respondents, indicating that they represent a problem and need development (Table 1). The Bloomreach Experience Cloud platform already analyzed, in addition to covering all aspects analyzed for this area, allows to answer these needs. This platform enables the automatic personalization of the website's contents in real time to each visitor. In addition, it offers an optimized website search with embedded AI for more relevant and personalized results.

In the area of SEO, the aspects that obtained the worst scores were the need to wait for the rankings to be updated in order to know the results of the optimizations (9.5), the ability to previously test/simulate optimizations (9.6) and the automation of SEO execution (9.10) (Table 2). The Alli AI solution was considered the most complete to meet the SEO needs, however, it can only solve the automation aspect of SEO execution (9.10). The Alli AI platform allows SEO optimizations to be done automatically. Additionally, it offers automatic recommendations for optimizations in the code and contents of the website. Of the analyzed solutions, the Market Brew platform is the only one that

offers features that allow to respond to the need of waiting for updates and prediction/simulation capability. This solution enables the creation of different search engine models, so-called analysis groups. Using AI, this feature allows the automatic simulation and prediction of any environment/search scenario, thus allowing to test optimizations in advance. In addition to this feature, Market Brew allows fast testing of changes, with neural network crawlers, without having to wait for the search engines to update their results in order to know the results of the optimizations.

In the area of Content Marketing, the aspects that received the worst scores were the automation of personalization (12.8), planning (12.5) and content optimization (12.10) (Table 3). All these aspects are covered by the features of the Concured platform. This solution allows content personalization automatically, offering custom CTAs and content recommendations automatically to each customer. Additionally, it enables the automation of content planning, search and optimization, with the intelligent and automated creation of a marketing brief. Also, regarding the automation of content optimization, in the case of text content, the Atomic Reach solution is an excellent option as it offers topic and content improvement suggestions, as well as the option to optimize text automatically.

The variables in the area of Email Marketing that obtained the worst scores were the automation of personalization to the audience (15.5) and the automation of optimization of email contents (15.3) (Table 4). Like all analyzed aspects for email marketing, these two are covered by Automizy. This solution provides features for optimizing email contents, such as automatic creation of subject lines and A/B testing of subject lines. In addition, it allows for automating the personalization to the audience with the possibility of building email automation with advanced personalization and segmentation according to the customer behavior on the website.

Regarding Social Media Marketing, the variables that obtained the worst scores were content optimization automation (18.9), personalization automation (18.7) and planning automation (18.5) (Table 5). The Cortex solution proved to be the most complete one for social media marketing and has features that allow to answer these needs. This platform enables the automation of content optimization and personalization, providing predictive recommendations of the best content to publish, according to the characteristics of the content that generate the highest performance and to the preferences and profile of the audience. Finally, this solution provides automatically generated content planning.

In the area of Online Advertising, all aspects obtained a positive score. However, the ability to predict the performance of campaigns (21.2) and the automation of campaign execution and optimization (21.5) were the worst rated (Table 6), presenting a positive response rate very close to the negative response rate. The negative response rate was still considerable high, and, in this regard, it is important to suggest solutions to meet these needs. Both Albert AI and Adobe Advertising Cloud proved to be complete solutions, however only the Adobe Advertising Cloud allows a response to these specific needs, namely the ability to forecast. This solution provides the ability to predict the performance of planned campaigns. In addition, it provides continuous and automatic optimization of performance and visibility of ads, with automatic allocation of budgets and bidding of ads, automating the execution.

In the area of Communication and Sales, the variables that obtained the worst scores were the automation of the interaction with leads (24.7), the optimization of interactions (24.9) and the automation of the lead qualification (24.4) (Table 7). The Conversica solution revealed to be the most complete to answer the communication and sales aspects, however it can only cover the needs of interaction automation and lead qualification. This solution enables personalized, autonomous and intelligent interaction with customers by artificial agents and provides automatic lead qualification. Regarding the need to develop the optimization of the interactions, both Automat and Drift Automation use AI for a continuous optimization of the conversations.

Regarding the Strategy and Data Analysis area, only the variable concerning the ability to predict events/actions and behaviors (27.4) obtained a negative score (Table 8). The indicated solution to meet this need is SAS Visual Forecasting. Even though it isn't the most complete solution, it is specifically dedicated to forecasting, providing several features related to this aspect, such as automatic analysis and chronological forecast and the development of forecasting models.

5. Conclusions

5.1. Theoretical conclusions

This research aimed to assess the potential level of impact that AI can have on digital marketing. Through the developed work it was possible to identify both the potential of the application of AI in digital marketing as well as the current context in which AI is already applied globally, through examples of authors and research of solutions. It was observed that there is a great potential of impact that AI can have on digital marketing, since the existing AI solutions have the ability to respond both to the general needs of each area of digital marketing, as well as to the specific aspects, identified as more critical. It is precisely in these aspects that lay the potential to generate great benefits with the application of AI in digital marketing.

The analysis of the survey results allowed finding the main problems and needs that digital marketing professionals face today. For each area of digital marketing, the aspects that received the worst rating were identified - the most critical aspects, which represent a problem and need development. For simplification purposes, these are summarized in Table 18. Furthermore, it was observed that the areas of SEO, Communication and Sales, and Content Marketing presented a worse overall score. It was in these areas that the digital marketing professionals identified more aspects in need of development. Therefore, it is in these areas that lies the greatest potential to generate benefits with the application of AI. In parallel, it was also observed that the areas of Strategy and Data Analysis, Online Advertising and Social Media Marketing presented the best overall scores. The values obtained indicate that these areas of digital marketing are already more developed and the potential to generate benefits with the application of AI is lower.

Table 18. *Worst rated aspects for each area of digital marketing.*

Area	Variable	Description / Question
Website/CX	6.1 Personalization	6.1 Personalization of the website experience to the customer (e.g. product recommendations according to each customer's behavior)
	6.2 Search	6.2 Website search optimization (reflects the level of intelligence of the search)
SEO	9.5 Waiting for Updates	9.5 Need to wait for the rankings to be updated in order to know the results of the optimizations
	9.6 Forecasting / Simulation	9.6 Ability to test/simulate optimizations in advance
	9.10 Execution Automation	9.10 Automation of SEO execution
Content Marketing	12.8 Personalization Automation	12.8 Automation of content personalization (e.g. website content recommendations automatically adjusted to each shopper)
	12.5 Planning Automation	12.5 Content planning automation (e.g. automatic creation of a marketing brief)
	12.10 Optimization Automation	12.10 Content optimization automation (e.g. automatic suggestions for content improvements)
Email Marketing	15.5 Personalization Automation	15.5 Automation of the personalization to the audience (e.g. automatic personalization of email content according to customer profile and website behavior)
	15.3 Optimization Automation	15.3 Automation of email content optimization (e.g. automatic creation of better performing subject lines)
Social Media Marketing	18.9 Optimization Automation	18.9 Content optimization automation (e.g. automatic suggestions for content improvements)
	18.7 Personalization Automation	18.7 Automation of personalization (e.g. automatic suggestion of content to publish personalized to the audience)
	18.5 Planning Automation	18.5 Automation of planning (e.g. automatic creation of a content plan)
Online Advertising	21.2 Forecasting	21.2 Ability to predict campaign performance
	21.5 Execution Automation	21.5 Automation of campaign execution and optimization (e.g. automatic adjustments to budgets in real-time, real-time automatic ad bidding, etc.)
Communication and Sales	24.7 Interaction Automation	24.7 Automation of lead interaction
	24.9 Optimization	24.9 Optimization of interactions (continuous improvement of conversations - questions and answers - in order to increase satisfaction or conversion rate)
	24.4 Lead Qualification Automation	24.4 Automation of lead qualification
Strategy and Data Analysis	27.4 Forecasting	27.4 Ability to predict events/actions and behaviors

Source: author

5.2. Practical contributions

The research of solutions carried out, allowed getting to know some of the existing AI solutions with applicability in digital marketing. The solutions collected were: Recommendations AI (Google Cloud); Bloomreach Experience Cloud; LiftIgniter; Market Brew; Alli AI; Can I Rank; Atomic Reach; Concured; Stackla; Automizy; Persado Pro Email; Mercanto; Cortex; Rocco; Unmetric; Albert AI; Acquisio Turing; Adobe Advertising Cloud; Automat; Conversica; Drift Automation; SAS Visual Data Mining and Machine Learning; SAS Visual Forecasting; Document AI (Google Cloud). The summarized results of this research are presented in the tables Table **19**; Table **20**; Table **21**; Table **22**; Table **23**; Table **24**; Table **25**; Table **26** at the end of the document. This research allowed not only to identify some of the solutions in the market, but also to understand the extent to which the AI is already applied in digital marketing. Although there is a lot of space for development and most of the digital marketing solutions do not incorporate AI yet, there are already some ready to use AI solutions for digital marketing.

The coverage analysis of the solutions regarding the aspects of each area of digital marketing allowed to realize that practically all the aspects evaluated in the survey are covered by some AI solution. Furthermore, it was possible to determine the best solution for each area of digital marketing, that is, the solution that covers the most aspects of each area and, for that reason, the most complete. Therefore, the following solutions are recommended: Bloomreach Experience Cloud for the website/CX area; Alli AI for SEO; Concured for content marketing; Automizy for email marketing; Cortex for social media marketing; Albert AI or Adobe Advertising Cloud for online advertising; Conversica for communication and sales; SAS Visual Data Mining and Machine Learning for strategy and data analysis.
The match analysis between the aspects that obtained the worst scores in the survey and the solutions' features with AI, allowed identifying and suggesting the best solutions to meet the specific needs of digital marketing professionals. For each of the main problems identified in the survey, a response solution was suggested. The suggested solutions offer features with built-in AI that directly address the aspects in question. Therefore, the following solutions are recommended: Bloomreach Experience Cloud for the needs of forecasting and personalization of the website/CX area; Alli AI for the needs of automating the execution of SEO and Market Brew for the needs of forecasting and waiting for SEO updates; Concurred for the content marketing needs of automating the processes of personalization, planning and optimization; Automatize for the email marketing needs of automating the personalization and optimization; Cortex for the social media marketing needs of automation of the processes of optimization, personalization and planning; Adobe Advertising Cloud to meet the online advertising needs of forecasting and automation of the execution; Conversion for communication and sales needs of automation of interaction and lead qualification and Drift Automation for continuous optimization of interactions; SAS Visual Forecasting to meet the strategy and data analysis needs of forecasting.

5.3. Limitations and future research

The results and conclusions of this study should be interpreted having in mind some limitations, namely: existing literature on the topic is not very extensive; sample collected by convenience and limited to 121 responses, leading to a margin of error (8.9%) that could be smaller with a larger sample; the possibility of existence of other aspects of digital marketing which have not been evaluated in the survey; the existence of other solutions that were not considered for this study in order to avoid excessive complexity; the analysis of the solutions only at a more superficial level according to the companies' websites instead of a practical and deeper analysis. It is also important to mention the possibility of some aspects of this research becoming obsolete rapidly. The very recent and constantly evolving subject, together with a new and fast-growing market of solutions can mean new developments in the existing literature on the subject and a fast transformation of the existing solutions with the introduction of new features and AI technologies. Therefore, additional and constant research on the subject is important. For future work, since this topic is still quite recent and relatively little-studied, it would be important to develop additional research on the topic, possibly collecting and

analyzing in more detail a larger number of solutions, or through a case study of the application of an AI solution in a real context.

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Appendix

Table 19. *AI solutions for the Website/CX area.*

Website/CX Solutions		
Description		**Features**
Recommendations AI (Google Cloud)	AI Recommendations provides personalized recommendations that meet the preferences of each client. It uses the latest Google ML architectures, which dynamically adapt to customer behavior and changes in variables such as offer and price.	Automatic collection and analysis of user activity and product catalog data **(AI)**; Production of predictions from all kinds of available data **(AI)**; Customizable recommendation strategy; Delivery on any channel and at any point of interaction; Curatorship, personalization and automatic and real-time delivery of recommendations **(AI)**; Metrics and performance tracking.
Bloomreach Experience Cloud	Bloomreach Experience Cloud is a platform for delivering digital experiences. It allows companies to create, extend, customize, analyze, test and optimize the digital experiences across all their channels.	Automatic collection and analysis of user activity and product catalog data **(AI)**; Creation and control on a single central platform (central and headless architecture); Easy integration with other platforms and tools; Customization of all website experience and content; Content distribution to any channel; Content and products personalized in real time to each visitor (e.g. product ranking, recommendations, search results, etc.) **(AI)**; Website search powered by AI for more relevant/personalized results **(AI)**; Optimization and tracking of merchandising performance **(AI)**.
LiftIgniter	LiftIgniter allows to customize all aspects of the customer experience. Using ML in real-time, it increases conversions through relevant and timely product and content recommendations.	Collection of user activity and product catalog data **(AI)**; Automatic analysis of collected data with ML algorithms **(AI)**; Predictive and automatic personalization/curatorship based on user's real-time behavior **(AI)**; Personalized recommendation of contents and products **(AI)**; Personalized presentation of contents and products **(AI)**; Performance analysis and key insights in real-time; Customization and testing of different recommendation strategies.

Source: author

Table 20. *AI solutions for the SEO area.*

SEO Solutions	
Description	**Features**

Market Brew	AI platform dedicated to SEO teams, for monitoring and analysis of algorithmic updates of any search engine.	Predictive search engine modelling (AI); Transparent search engine modeling, exposing insights and ranking factors (AI); Precise, self-calibrating and customizable search engine model (AI); Automatic simulation/analysis of any search environment (search engine, audience/keywords, competition) (AI); Suggestion of optimal actions/changes to the website (AI); Fast testing, with neural network crawlers - crawling performed by the SEO team, with no need to wait for search engines to update their results (AI).
Alli AI	Platform to support the management of SEO operations with embedded AI.	Automatic adaptation to changes in search engine algorithms (AI); Automatic discovery and indexing of the best links (brand, niche and outreach) (AI); Automatic Optimizations (AI); Recommendation of optimizations in the code and contents of the website (AI); Step-by-step SEO strategy planning (AI); Automatic audience analysis (keywords) (AI); Traffic and rankings tracking (AI).
Can I Rank	SEO software that gathers information from several websites and SEO tools and adds an extra layer of AI to suggest personalized actions.	Automatic and personalized keyword search (AI); Automatic keyword scoring (relevance, ranking difficulty, ROI score) (AI); Automatic SERP analysis and tracking for each keyword (AI); Competitive SEO Analysis (AI); Automatic suggestion of concrete SEO actions - action plan (AI); Weekly and automatic progress reports (AI).

Source: author

Table 21. *AI solutions for the Content Marketing area.*

Content Marketing Solutions		
Description		**Features**
Atomic Reach	Using AI, customizes and optimizes text content for superior performance. It is applicable in several formats such as: blog posts, marketing emails, Google Ads, product descriptions and websites.	Automatic gathering of insights (AI); Suggestions of topics and optimizations (AI); Automatic personalization to target audience (AI); Automatic optimization of text content (AI); Prediction of audience behavior (AI); Performance tracking; SEO tracking; Integration with the existing workflow.
Concured	Content strategy platform that uses AI to analyze the content consumed by the audience to determine the factors that generate greater engagement, suggesting the creation of optimized content tailored to the audience.	Insight gathering with AI (AI); Automatic Benchmarking and Share of Voice (AI); Intelligent creation of the marketing brief, automating planning, search and optimization of content (AI); Support for content creation based on gathered insights (AI); Automatically personalized content recommendation (AI); Personalized CTAs (AI); Automatic identification, scoring and delivery of content to the customer (AI).
Stackla	Corporate platform based on AI to discover, manage and display user generated content with higher engagement, in all marketing contact points.	Support for displaying content in different channels (ads, websites, e-commerce, email and events); Intelligent content discovery and curation in real time (AI); Management and publication of all contents in a single platform; Automatic content organization with visual recognition (AI); Predictive content recommendations (publishing, tagging and rights management) (AI); Influence marketing management tool; Integration with other platforms.

Source: author

Table 22. *AI solutions for the Email Marketing area.*

Email Marketing Solutions		
Description		**Features**
Automizy	Automizy is an email marketing software designed to increase the opening rate of emails. It offers several email marketing tools, some of them enhanced with Mizy AI.	Supports the creation of high open-rate campaigns (Tester and generator of subject lines (AI); AB testing of subject lines (AI); Automatic resend to non-openers (AI); Drag-and-drop editor with templates); Delivery of emails at the right time to the right people (Email automation building (AI); Website behavior tracking and product tagging (AI); Advanced personalization and segmentation (AI); Increase of the subscribers list (Creation of subscription forms); Result tracking (Statistics on email performance, campaigns, automation and forms); Integration with several tools.
Persado Pro Email	Persado Pro Email is an AI software for language creation and emotional analysis of text content, which helps marketers to create emails with better performance.	Predictive generation of subject lines with better performance (AI); Language and style adjustment to the brand voice (AI); Multiple personalization options with recommendations (AI); Language and emotion analysis with recommendations for better performance (AI); Performance tracking; Integration with the most popular ESP platforms.
Mercanto	Email marketing software powered by AI and ML to discover and display in real time personalized email content. Analyzes website components. Creates a customer profile according to the behavior on the website. The collected data allows for the creation of personalized emails.	Simple drag-and-drop interface; Supports creation, testing and sending of emails; Website behavior tracking and product tagging (AI); Intelligent segmentation according to the customer profile built by AI (AI); Automatic and real-time personalization of emails according to customer profile and behavior (AI); Automation of emails in response to events (AI); Dashboard with insights for performance tracking; Integration with the most popular ESP platforms.

Source: author

Table 23. *AI solutions for the Social Media Marketing area.*

Social Media Marketing Solutions	
Description	**Features**

Cortex	Social media content optimization platform dedicated to marketing professionals and agencies to continuously improve the engagement of their publications. Supports the creation and strategy of campaigns, as well as the optimization of content and its delivery.	Based on company and market insights (AI); Automatically generated content planning (AI); Personalization to the audience (AI); Optimization and predictive recommendation of the best content (AI); Optimization of content delivery (recommendation of publication schedules and advertising budgets) (AI); Continuous improvement of the content distribution strategy (AI); Automatic monitoring of competition and industry (AI); Tracking of the social media performance.
Rocco	Social media marketing assistant with AI, who suggests new content to marketers, with which the audience is likely to be engaged.	Easy integration with existing workflow and channels; Automatic suggestion /curation of personalized content to the audience (AI); Automatic campaign tracking and analysis (AI); Automatic gathering of insights on published content (AI).
Unmetric	Xia, Unmetric's AI solution, supports the management of social media by gathering the most relevant insights on content, campaigns and competitors.	Automated insight reports (AI); Content research and planning; Benchmarking and campaign tracking; Monitoring of market and competition social networks (AI).

Source: author

Table 24. *AI solutions for the Online Advertising area.*

Online Advertising Solutions		
	Description	**Features**
Albert AI	Albert is a self-learning solution that processes and analyzes data on a large scale, allocating budgets autonomously, continuously optimizing evolving campaigns in paid advertising channels such as search (e.g. Google Search), social media (e.g. Facebook) and programmatic advertising (e.g. YouTube).	Campaign planning support by collecting relevant data (business objectives, KPIs, content, audience data); Automatic and personalized creation and execution of campaigns (AI); Continuous and automatic testing and optimization of campaigns/advertisements (AI); Autonomous presentation of analysis reports, insights and recommendations (AI).
Acquisio Turing	Acquisio Turing is a PPC advertising management software powered by ML. A set of over 30 predictive algorithms work together to analyze SEM marketing campaign data. The platform continuously learns and makes smart decisions about bids and budgets in real time.	Automatic campaign optimization (AI); Real-time automatic bidding (AI); Automatic adjustments to budgets in real time (AI); Automatic budget distribution (AI); Traffic and lead estimation/prediction (AI); Optimization recommendations (AI); Performance tracking.
Adobe Advertising Cloud	Adobe Advertising Cloud is a programmatic advertising management platform. Powered by Adobe Sensei, Adobe's AI, it supports the planning, purchase, management and optimization of ads for better performance and resource allocation in a single platform.	Performance prediction for planned campaigns (AI); Budget allocation recommendation (AI); Continuous and automatic optimization of the performance and visibility of advertisements (automatic allocation of budgets / automatic ad bidding) (AI); Discovery of new audiences with Look-Alike Modeling (AI); Predictive and personalized planning of TV ads (AI); Automatic optimization and personalization of the rotation of different creative variants of ads (AI); Automatic tracking and reporting of campaign performance (AI).

Source: author

Table 25. *AI solutions for the Communication and Sales area.*

Communication and Sales Solutions		
	Description	**Features**
Automat	AI and ML technology that helps brands deliver personalized conversational experiences to each individual consumer, dynamically optimizing conversion for the best results.	Automatic interaction with visitors through conversational interfaces (AI); Automatic characterization of visitors (AI); Automatic management of product inventory, customized to each customer (AI); Personalized product recommendation (AI); Creation and customization of conversations; Continuous optimization of conversational conversion (AI).
Conversica	Sales assistants with AI who help companies find and retain customers more quickly and efficiently by reaching, interacting, qualifying and automatically follow-up on leads through natural, multi-channel and bidirectional conversations.	Automatic initial contact with potential customers, customers who requested the contact, or former customers (AI); Personalized, autonomous and intelligent interaction with customers (AI); Follow-up throughout the customer's journey (AI); Automatic lead qualification (AI); Automatic forwarding of leads with potential to the sales team (AI); Supports the email and SMS channels and multiple languages; Real-time insight gathering (AI); Integration with existing technological systems; Personalization of the conversations conducted by the AI assistants with the conversation editor.
Drift Automation	Drift Automation is a marketing automation service that offers AI-enabled automatic conversation solutions. AI analyzes past conversations to understand each business. The conversation robot is trained and tested with a small audience and finally the robot is ready to interact with each customer from 1-1 conversations on the company website.	Automatic initial contact with website visitors (AI); Interaction and customer support through 1-1 conversations enhanced with AI (AI); Automatic answers, guiding the visitor to relevant pages or suggesting the scheduling of meetings (AI); Real-time lead qualification (AI); Continuous learning and optimization (AI).

Source: author

Table 26. *AI solutions for the Strategy and Data Analysis area.*

Strategy and Data Analysis Solutions		
	Description	**Features**
SAS Visual Data Mining and Machine Learning	Data analysis support software. Supports the complete DM and ML process, with a visual or programming interface. Empowers the analysis team members with a simple, powerful and automated way to handle all tasks in the analysis life cycle.	Automatic display of insights and interpretations (AI); Preparation, exploration and modeling of different types of data (text, image, etc.) (AI); Development of ML models manually or automatically (AI); Analysis support and ease of use of analytical capabilities; Offers both a visual and programming interface; Integrated and collaborative environment between data scientists, business analysts and other professionals.
SAS Visual Forecasting	A forecasting ecosystem to quickly and automatically produce a large number of reliable predictions.	Automatic analysis and chronological forecast (AI); Automatic segmentation of the different data of a project (AI); Personalization of the forecasting model to the context in question; Forecasting models already incorporated (AI); Development of forecasting models (AI).
Document AI (Google Cloud)	AI solution for analysis and collection of useful insights from documents.	Document reading with OCR technology for text, character and image recognition (AI); Automatic collection of valuable information / useful insights from unstructured documents (AI).

Source: author