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Title of the Master´s Thesis:

Artificial Intelligence in Digital Advertising:

Qualitative Study

Author: Malgorzata Izabela Jablonska

Supervisor: prof. Ing. Latislav Tyll, MBA, PhD.

Declaration of Authenticity

I hereby declare that the Master´s Thesis presented herein is my own work, or fully and specifically acknowledged wherever adapted from other sources. This work has not been published or submitted elsewhere for the requirement of a degree program.

Prague, May 15th, 2018   Signature

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Artificial Intelligence in Digital Advertising: Quantitative Study

Abstract:

The recent developments in the field of artificial intelligence are disrupting entire industries, including online marketing. The purpose of this dissertation is to establish the implications of the introduction of AI-based solutions in digital advertising. A series of in-depth interviews with industry representatives revealed that the automation is being mainly used in bidding, audience targeting, attribution and programmatic. While offering substantial time savings and cost effectiveness, the AI-fuelled features might scare users due to their complexity and data requirements. Moreover, there seem to be three main effects on the different incumbents within the value chain, namely job redefinition, shift of control and changes in advertisers' priorities. The research concludes with suggestions on how to make the most of the above-mentioned disruption.

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1. INTRODUCTION

"AI is probably the most important thing humanity has ever worked on. I think of it as something more profound than electricity or fire. Any time you work with technology, you need to learn to harness the benefits while minimising the downsides."

Sundar Pichai (Google's CEO)

Technology has the transformative potential to influence and change the way we live and interact with our surroundings. The disruption and corresponding shifts that would have seemed unimaginable a few years ago, are now changing the way the world operates. The exponential spread of internet was the foundation of what economists would later define as the Fourth Industrial Revolution (Rifkin, 2011) - an era in which the impact of the Artificial Intelligence (AI) cannot pass unobserved. This relatively recent megatrend, in fact, promises to be even more revolutionary by bringing extensive shifts in how people perceive and interact with the technology.

Since AI brings along a proliferation of applications, it comes as no surprise that it is quickly gaining corporate executives attention across numerous industries. With machines performing an increasing number of tasks, often more effectively than humans, the topic of artificial intelligence is on the agenda of many marketers. AI and machine learning are extremely complementary to marketing because of the efficiency and adaptability they lend to your analytics and reporting system. This is especially apparent when it comes to prioritizing the various optimizations of your marketing efforts. For advertising artificial intelligence can use machine learning algorithms to identify consumers and consumer trends and serve relevant ads that have a higher chance of converting.

As we will see in the chapters to follow, we are witnessing the power of smart machines and artificial intelligence transform advertising landscape and affect the different members of the value chain. Although the future and the development of artificial intelligence are still uncertain, one thing is safe to say: AI is here to stay.

1.1. OBJECTIVES

Building upon the growing importance of the trend described above and the disruption that ensues, this thesis intends to outline the impact of the artificial intelligence in the digital advertising industry. In order to fulfil the main objective, the author set several sub-goals to further investigate the topic.

First, the theoretical part aims to describe the different branches of artificial intelligence and their adoption in the digital advertising industry. In this section, we will touch upon both the solutions that aim that enhancing the already existing platforms and those that create new market opportunities.

Secondly, through a qualitative study, the author will try to assess what are the implications of the introduction of artificial intelligence in digital advertising. A particular attention will be directed towards the artificial intelligence features used today in online advertising and the advantages and disadvantages of these kind of solutions. Last, but not least, the author will strive to evaluate how these disruptive technologies affect different incumbents within the industry.

The author of the thesis aspires to advance the knowledge in the field by summarizing the literature regarding the artificial intelligence technologies and the recent developments in digital advertising. The theoretical value of the thesis lies in the aggregation of available literature and developing a comprehensive description of the AI applications in this landscape. Moreover, analyzed strategies of big advertising companies and their impact on the different incumbents within the value chain described in the practical part can be used as a theoretical background for further research in the field.

The practical value of this thesis lays in the relevance of the topic treated and its applicability to many stakeholders. In fact, this report can be used universally by both people working in the advertising industry as well as companies using AI-driven solutions as part of their marketing efforts. The results are intended to provide them with valuable insights about the way the market is currently evolving and hopefully to serve as source of information and inspiration for ideas on how to further improve and innovate their businesses.

1.2. MOTIVATION

There are two main reasons that have influenced author's decision to focus on the topic of artificial intelligence in the digital advertising. Firstly, the exponential growth of the industry where the only constant seems to be the change. Due to continuous developments both in digital advertising and artificial intelligence field, scientific and public coverage of the topic tends to become outdated very quickly. Moreover, if current observations are of any indication, we can assume that the artificial intelligence software is the foundation of the digital advertising of the future.

The second reason is due to the author herself currently working at one of the leading tech companies, and deals with the topic on a daily basis. In fact, discussions about algorithm automation and its impact on marketing strategies, emerge with both clients and peers working in this vertical. By conducting this research, the author aspires to gather a better understating of the market dynamics and as a consequence to provide the customers and colleagues with interesting insights in this regard.

For the aforementioned reasons, the research on the topic of AI applications in digital advertising is well needed not only for the big advertising companies but for all the members of this ecosystem.

1.3. WORK STRUCTURE

Once the goal of the thesis is clear, having a coherent structure is the next step. This study is composed by three main pillars. In the opening of this thesis, the reader will find a short definition of artificial intelligence followed by a paragraph dedicated to the rise of this discipline and an overview of the most relevant milestones. This part of the dissertation allows a less academic or scientific audience to understand the basics of the topic and familiarize themselves with the concept of artificial intelligence. The comprehension of the terminology and development of AI systems is, in fact, indispensable to proceed with the reading.

Following this, the study will lead the reader towards the overview of the digital advertising landscape. Starting with a brief summary of industry insights, history and recent developments, the thesis will follow with the breakdown of the value chain and a short description of the main players. Understanding these relations will allow the reader to better comprehend the choice of different interviewees presented in the qualitative study of this thesis.

To conclude the literature review pillar, there will be an overview of the AI solutions that have already been implemented and widely used in the sector of digital advertising. We will touch upon the technologies that aim at enhancing the existing advertising platforms as well as how these technologies create new opportunities and challenges for the market.

While there is an abundance of reports and academic papers regarding the influence of artificial intelligence on digital advertising industry, relevant documents that would capture how those changes are perceived by different incumbents within the industry are hard to be found. Consequently, the second pillar of this paper will focus on understanding to what extent the different stakeholders are aware of the disruption happening around them, what is their level of knowledge in this field and finally, what is their perception about the future of digital in general. The main research question that the author tried to answer in this part was "what is the impact of artificial intelligence at digital advertising industry?" Moreover, information about the research methodology and sample selection as well as study limitations could be found here.

Finally, the third and last pillar, will summarize the findings from the study performed and will expose the conclusions to the reader. In this part the author reflects on the future of digital advertising and suggests topics that would deserve further research.

2. LITERATURE REVIEW

2.1. INTRODUCTION TO ARTIFICIAL INTELLIGENCE

The aim of the first part of the literature review is to gather a basic understanding of what the term "artificial intelligence" stands for and to comprehend which events contributed to this megatrend. As AI is an extremely vast and complex sector, the author has only extrapolated information considered relevant for the purpose of this study and hence the below summary is by no mean exhaustive.

2.1.1. WHAT IS ARTIFICIAL INTELLIGENCE?

The artificial intelligence (AI) core focuses on the development of valuable, automated solutions (i.e. intelligent agents/systems) to problems which would require the intervention of intelligence if done by humans (Negnevitsky, 2004). In a business context, there are problems to be tackled that require this particular characteristic, which need human judgement and analysis to assess and solve these problems with guarantees of success. These decisional situations frequently relate to strategic issues in firms, where problems are far from being well-structured.

The scope and the main goals of AI research have gone through numerous mutations since the official foundation of this discipline, however relying on the literature we can conclude that the traditional problems that AI is trying to address include reasoning, natural language processing, knowledge, planning and the ability to manipulate objects among others (Russell and Norvig 2009).

As for the definition of the term, the following emerge:

- *"The exciting new effort to make computers think . . . machines with minds, in the full and literal sense" (Haugeland, 1985)*
- *"The study of mental faculties through the use of computational models" (Charniak and McDermott, 1985)*
- *"The art of creating machines that perform functions that require intelligence when performed by people" (Kurzweil, 1990)*

-   *"The branch of computer science that is concerned with the automation of intelligent behavior" (Luger and Stubblefield, 1993)*

In order to grasp the complexity and extensiveness of the field, the reader can refer to the below figure (Figure 1) that outlines the main branches developed so far.

Figure 1: Artificial Intelligence Tree
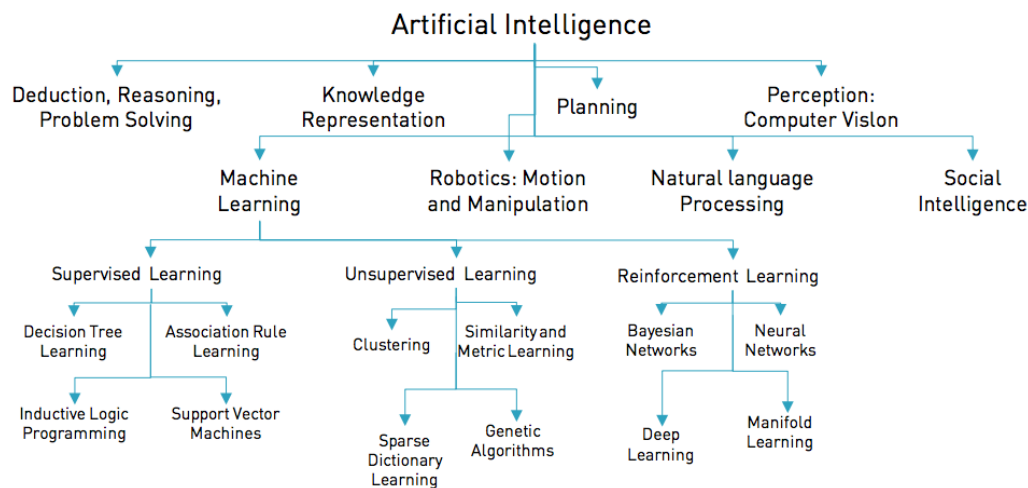
Source: Forrester Research Inc

Moreover, according to Negnevitsky (2004) we can identify two dimensions while reviewing AI-related literature: thought process and behavior; those can be further categorized in the following way:

Figure 2: Categories for definition of AI

Systems that think like humans	Systems that act like humans
Systems that think rationally	Systems that act rationally

Source: Negnevitsky, M. (2004). Artificial intelligence: A guide to intelligent systems

As one might expect, a tension exists between approaches centered around humans and approaches centered around rationality. At the same time, it comes as no surprise that

digital advertising will be inclined more towards a rationalistic approach based on mathematics and engineering rather than empirical science. Hence, in the upcoming chapters of the thesis the term "artificial intelligence" will be used with its "rational" connotation.

Before we dive into the application of artificial intelligence in digital advertising which is the core of this dissertation, it is essential to first categorize the different AI branches. The following paragraphs will therefore include a short overview of the main subfields of AI allowing the reader to familiarize themselves with the topic and the terminology that are most relevant for the industry in study.

MACHINE LEARNING

The term of Machine Learning was first coined by Arthur Samuel (1959) and is defined as a subset of Artificial Intelligence which aims at providing machines with the ability to learn without explicitly programming and to build a generalized model upon a given set of training cases. The idea was born when the scientists realized that instead of trying to build an intelligence, they could build a system that could develop its own "brain", able to evolve and adapt with the filling of new data. So far, the Machine Learning systems can be categorized into 3 learning methods :

- Supervised Learning - the system is given a set of labelled cases (training set) and asked to create a generalized model on those to act on unseen cases.
- Unsupervised Learning - the system is given a set of cases unlabelled and asked to find a pattern in them. Good for discovering hidden patterns.
- Reinforcement Learning - the system is asked to take an action and is given a reward. The system must learn which actions would yield most rewards in certain situations

Machine learning is a task-oriented application of statistical transformations. Accomplishing the task will require a process or set of steps, rules, etc. The process or set of rules to be followed in calculations or problem-solving operations is called an algorithm. When designing a learning machine, the engineer programs a set of algorithms through which the machine will process data. As the machine learns – gets feedback – it typically will not change the employed statistical transformations but rather alter the algorithm. For example, if

the machine is trained to factor two criteria in evaluating data and it learns that a third criteria has high correlation to the other two and refines the accuracy of calculation, it could add that third criteria to the analysis. This would be a change to the steps (algorithm), but not the underlying math.

Michalski, Carbonell and Mitchell (1983) have organized the field of machine learning around three primary research foci:
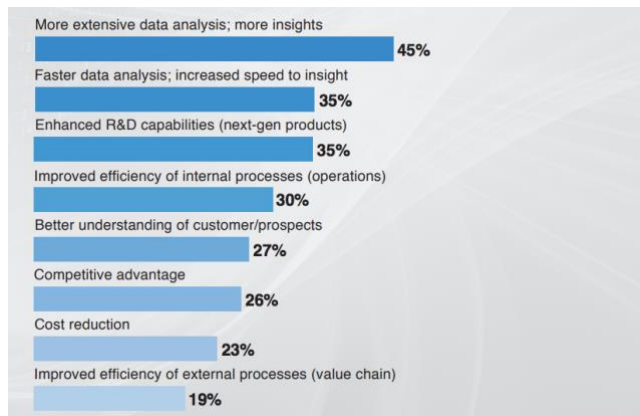
- Task-Oriented Studies - the development and analysis of learning systems to improve performance in a predetermined set of tasks (also known as the "engineering approach")
- Cognitive Simulation - the investigation and computer simulation of human learning process
- Theoretical Analysis - the theoretical exploration of the space of possible learning methods and algorithms independent of the application domain

Since then, many research efforts strived primarily towards one of these objectives however progress towards one objective often led to progress towards the remaining two.

Currently the field of machine learning is one of the fastest developing and has encountered great success in the areas of Computer Vision and Text Analysis that, as we will discover later on, found numerous applications in the digital advertising. Hence, it comes as no surprise that the machine learning patents grew at 34% Compound Annual Growth Rate (CAGR) between 2014 and 2017, the third-fastest growing category of all patents granted (Forbes, 2017). Moreover, Deloitte Global predicts the number of machine learning pilots and implementations will double in 2018 compared to 2017, and double again by 2020 while the The global machine learning market is expected to grow from $1.41B in 2017 to $8.81B by 2022, attaining a 44.1% compound annual growth rate (CAGR).

A recent survey conducted by MIT Technology Review in collaboration with Google (2017) has shown that 45% of ML adopters say the technology has led to more extensive data analysis and insights while 35% claim they are able to get the information much faster (Figure 3).

Figure 3: Gains from the implementation of Machine Learning

More extensive data analysis; more insights — 45%
Faster data analysis; increased speed to insight — 35%
Enhanced R&D capabilities (next-gen products) — 35%
Improved efficiency of internal processes (operations) — 30%
Better understanding of customer/prospects — 27%
Competitive advantage — 26%
Cost reduction — 23%
Improved efficiency of external processes (value chain) — 19%

Source: MIT Technology Review, 2017

DEEP LEARNING

In many ways, deep learning (DL) is considered one of the most interesting and promising subsets of AI, now widely used by the world's most valuable public companies (Schmidhuber, 2017). It is a subfield within machine learning that is based on algorithms for learning multiple levels of representation in order to model complex relationships among data. Higher-level features and concepts are thus defined in terms of lower-level ones, and such a hierarchy of features is called a deep architecture (Li & Dong, 2014).

The ancient term "deep learning" was first introduced to Machine Learning by Dechter (1986) when DL started to be considered a computing construct based loosely on the architecture of the human brain. The particularity of this system lays in its ability not only to analyze large amounts of data, but also to develop a basic pattern recognition without explicit instructions. The main role here is played by neural networks - a set of algorithms able to interpret sensory data through a kind of machine perception, labelling or clustering raw input. This type of networks is built of several layers that are made of nodes - a point where computation occurs by combining input with a set of coefficients or weights. A node, comparable to a neuron in the human brain, fires when it encounters sufficient stimuli. The final classification is done based on the answers gathered in above-mentioned nodes through a series of binary true/false questions or by extracting a numerical value from the input data. It comes as no surprise that a computer equipped with such a sophisticated system could take

an image and to affirm with an exceptionally high probability of accuracy what it means to humans. The first mention of deep learning in connection with artificial neural networks (ANNs) can be found in the work of Aizenberg et al. (2000). Computer scientist and leading AI expert, Sebastian Thrun, explains the functioning of ANN as follows: "In the brain, neural synapses are strengthened and weakened through repeated activation; these digital systems aim to achieve something similar through mathematical means, adjusting the "weights" of the connections to move toward the desired output. The more powerful ones have something akin to layers of neurons, each processing the input data and sending the results up to the next layer." (Mukherjee, 2017). Multiple layers of artificial neurons are processing inputs and then sending these processed signals to other "deeper" layers, repeating this process all the way up to the final output layer (Figure 4).

Figure 4: Scheme of artificial neural network with two hidden layers
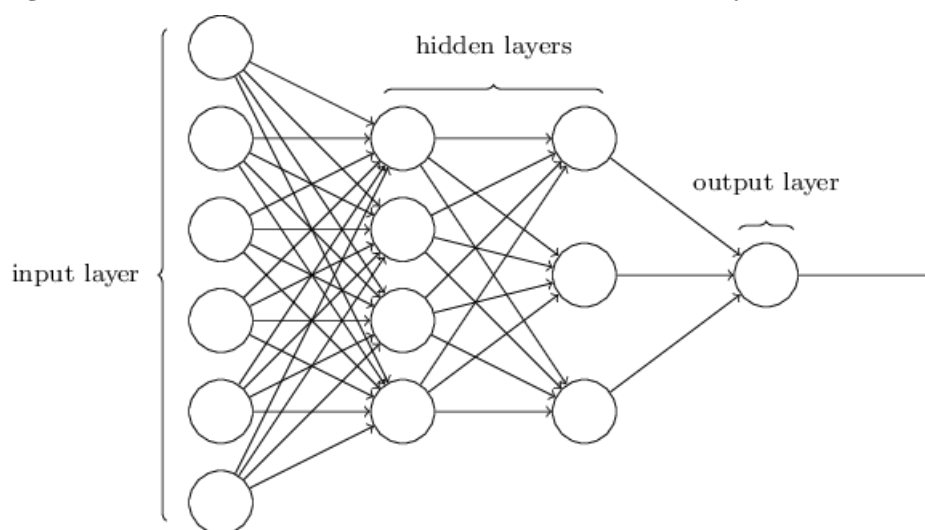
Source: Nielsen, 2015

Deep learning is also sometimes referred to as Hierarchical Feature Learning since the system is able to automatically learn complex features through multiple levels of abstraction. As Goodfellow & Bengio (2016) explain, "The hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones. If we draw a graph showing how these concepts are built on top of each other, the graph is deep, with many layers. For this reason, we call this approach to AI deep learning." Since the limitation of the data DL can ingest, sometimes defined as "plateau in performance", has not been found yet, its

applications are exponentially growing: image recognition, text analysis, product recommendations, fraud-prevention, and content curation just to mention a few.

The numbers connected with DL look very promising as well: Tractica (2017) forecasts that deep learning software revenue will grow from $655 million in 2016 to $34.9 million worldwide by 2025 with North America being the main revenue driver (Graph 1).

Graph 1: Deep Learning Software Revenue by Region, World Markets: 2016-2025
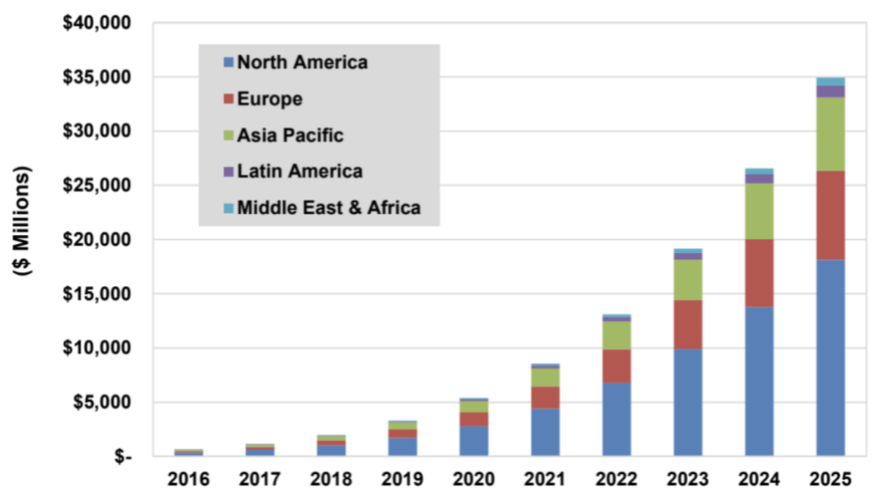
Source: Tractica, 2017

The market intelligence firm anticipates that the top 10 use cases for deep learning, in terms of revenue, will be as follows:

1. Static image recognition, classification, and tagging
2. Machine/vehicular object detection/identification/avoidance
3. Patient data processing
4. Algorithmic trading strategy performance improvement
5. Converting paperwork into digital data
6. Medical image analysis
7. Localization and mapping
8. Sentiment analysis
9. Social media publishing and management
10. Intelligent recruitment and HR systems

According to Groopman (2017), one of the top influencers in the field of consumer-side IoT, blockchain, and AI, businesses around the world are beginning to harness deep learning due to its ability to drive efficiencies in the form of speed, accuracy, agility, and access in several key areas. These areas include product development and improvement, process optimization and functional workflows, personalization and customer insight, sales optimization, and innovation and long-range strategy.

NATURAL LANGUAGE PROCESSING

The Natural Language Processing (NLP) was born from the willingness to achieve one of the first goals of artificial intelligence to create programs capable of understanding and generating human language. Although the programs currently available on the market got to the point of understanding the human speech, systems that can use natural language with the flexibility and generality of a human being are beyond current methodologies.

A definition of NLP offered by Liddy (2001) states it "is a theoretically motivated range of computational techniques for analysing and representing naturally occurring texts at one or more levels of linguistic analysis for the purpose of achieving human-like language processing for a range of tasks or applications". The choice of the word 'processing' is very deliberate, and should not be replaced with 'understanding'. For although the field of NLP was originally referred to as Natural Language Understanding (NLU) in the early days of AI, it is well agreed today that while the goal of NLP is true NLU, that goal has not yet been accomplished. A full NLU System would be able to:

1. Paraphrase an input text
2. Translate the text into another language
3. Answer questions about the contents of the text
4. Draw inferences from the text

While NLP has made serious inroads into accomplishing goals 1 to 3, the fact that NLP systems cannot, of themselves, draw inferences from text, NLU still remains the goal of NLP.

As for the methods used for processing and extracting meaning from NL, semantic indexing is undoubtedly the most common. Talking about the benefits instead, NLP processes improve the accuracy of documentation, and identify the most pertinent information from

large database. The applications of NLP vary from information retrieval, text mining, question answering and machine translation to sentiment analysis or topic extraction (Kiser, 2016).

STRONG AI

Strong AI also called True Intelligence or Artificial General Intelligence (AGI) is a term used to describe a certain mindset of artificial intelligence development that aims at reaching intellectual capability equal to a human's. As such, it has not only the ability to reason, make judgments, plan, learn, and communicate but it should also have consciousness, objective thoughts and self-awareness (Investopedia, 2017).

The ideal Strong AI machine, would be built in the form of a man, have the same sensory perception as a human, and go through the same education and learning processes as a human child. (Copeland, 1993). Essentially, the machine would be "born" as a child and eventually develop to an adult in a way analogous to human development. At present Strong AI development is overshadowed by the immediate applications of Applied AI, as that field yields more tangible and quantifiable results. In addition, development in embodied systems has not progressed beyond the most basic constructs without the overall intelligence of even a cockroach. However, it can be argued that the single largest stumbling block to Strong AI is the lack of definition of intelligence (Copeland, 1993). Strong AI's ultimate goal is to make an intelligent computer that can think and understand, but those terms remain ambiguous and undefinable; hence, there is no general measure of "success" in the field of Strong AI. The concept of intelligence varies from person to person, and as a result, a standardized test like the Turing Test becomes less important.

2.1.2.THE RISE OF AI-BASED SYSTEMS

Before jumping into the mapping of the current status of the artificial intelligence, it's useful for the reader to understand when this type of technology was born and how it has developed throughout the years. According to Pamela McCorduck (2004), an American writer specialized in the history and philosophical significance of the artificial intelligence, it all began "in antiquity, with myths, stories and rumors of artificial beings endowed with intelligence or consciousness by master craftsmen". She then continues "AI began with an

ancient wish to forge the gods." Later in the 19th century, mathematicians George Boole and Gottlob Frege conducted a systematic research and clarified the concepts of propositional logic and predicate calculus that would have served as the basis for studies of machine learning. However, the seeds of modern AI were planted only in the 1940s with the invention of the first programmable computer, Colossus that brought a big deal of excitement. This apparently small step for man, was actually one giant leap for mankind - it was the very first time, in fact, that the idea of a software with cognitive abilities have crossed the scientists' and mathematicians' minds. It comes as no surprise that the question "Can machines think?" mentioned in the paper "Computing Machinery and Intelligence" by Alan Turing (1950), opened up a long debate about its feasibility. In fact, in 1950 Alan Turing famously proposed a test designed to provide a satisfactory operational definition of intelligence. A computer passes the Turing Test if a human interrogator, afterposing some written questions, cannot differentiate between the responses coming from a person and the responses coming from a computer (Russell & Norvig, 2009).

Russell & Norvig (2009) defined the following capabilities that a computer needs to command in order to pass the Turing Test:

- natural language processing to enable it to communicate successfully in English;
- knowledge representation to store what it knows or hears;
- automated reasoning to use the stored information to answer questions and to draw new conclusions;
- machine learning to adapt to new circumstances and to detect and extrapolate patterns

There are two additional capabilities, connected to physical interaction between the interrogator and the computer, that are required in order to pass the so-called Total Turing test:

- computer vision to perceive objects, and
- robotics to manipulate objects and move about.

Consequently, the term of Artificial Intelligence and the corresponding field of research were fruits of a conference at Dartmouth College in 1956 while the attendees

including John McCarthy, Marvin Minsky, Allen Newell, Arthur Samuel and Herbert Simon, became the pioneers of this research. The main agenda point for the above-mentioned gathering was to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it (McCarthy, 1956). The immediate results that included computers solving word problems in algebra and proving logical theorems gained not indifferent attention, to the point where the American Department of Defence decided to generously fund the project. The financial support not only permitted the establishment of numerous laboratories around the world but also filled the researchers with enthusiasm and optimism regarding this venture. In 1967 Marvin Minsky from the Massachusetts Institute of Technology (MIT), wrongly claimed that the challenge of AI would be solved within a generation. As we could see in the years to follow, the entire group clearly underrated their mission and failed to estimate the difficulty of some of the awaiting for them tasks. In fact, after nearly 20 years from the conference at Dartmouth College, the "AI winter" has come - a notable slowdown due to withdrawal of funds from both the U.S. and British governments that together with the US Congress did not perceive the project as productive enough. The Lighthill report has definitely contributed to this decision by foreseeing a pessimistic future for the core aspects of research concerned with AI since, as it claimed, "in no part of the field have discoveries made so far produced the major impact that was then promised" (Lighthill, 1973)

While Europe and the U.S. were under a notable deceleration, Japan instead has taken considerable steps to advance in this field by developing ingenious computer architecture. In order not to stay behind, in the shadow of the Asian advancement, the above-mentioned governments had no choice if not to unfreeze the funding for a market that at that time has reached over a billion dollars. However, after no long time, precisely towards the end of 80s, AI experienced its second winter mainly due to the microcomputer revolution and consequent collapse of the Lisp Machine. Not to mention the numerous limitations the researchers themselves were facing that included, but were not limited to, extremely high costs associated with the construction and the maintenance of large systems and lack of common sense. The entire process got renewed at the beginning of the 21st century due to the explosion of the big data trend, the growing importance of internet and increasing computational power. Moreover, the researchers took a different approach by seeking on solving specific problems rather than generalizing and by committing more to mathematical methods and scientific standards. AI was no longer a self-standing discipline but a useful mean for other areas such as data mining, logistics and medical diagnosis. One of the first triumphs in the field was

undoubtedly the famous chess game between Garry Kasparov, a world chess champion back then and Deep Blue, a supercomputer invented by a multinational technology company IBM.

2.2. DIGITAL ADVERTISING

Some of the world's most well-known IT companies are in fact advertising companies deriving their primary revenues through digital advertising. For this reason, these IT giants are able to continually drive the evolutions of information technology and potentially to impact its underlying ecosystem for good or ill. Before discovering the online advertising landscape, let's define what the term "digital advertising" stands for.

According to Financial Times lexicon, digital advertising, also referred as online marketing, consists of "the marketing of products or services using digital channels to reach consumers. The key objective is to promote brands through various forms of digital media." McKinsey & Company, one of the leading consulting firms, defines more precisely digital as "creating value at the new frontiers of the business world, creating value in the processes that execute a vision of customer experiences, and building foundational capabilities that support the entire structure." In few words, online advertising is a driving force for monetization thought the Internet.

In examining new media and its characteristics, it is important to realize that internet advertising is still relatively young, having begun in 1994 when Hotwire launched its first banner ad (see Figure 5). Rumour has it that the first internet users were so impressed by this new format that the banner got a 46% click-through-rate. By comparison, today, a decent CTR is around 0.6%. At this point, the low number of websites available on the net had allowed advertisers and publishers to connect directly and to manually insert ads on websites.

Figure 5: Hotwire's first banner ad

Source: Business Insider

Moreover, for much of the first decade of its existence, it is probably fair to say that failure- was more common than success among advertising formats such as simple pop-up ads, email advertising or newsgroup advertising. In fact, 1996 saw the start of IAB – Interactive Advertising Bureau, which mission was to set standards and regulate the growing advertising industry. Only two years later the world witnessed the birth of the one player that, to this day, still leads the digital advertising industry: Google. Moreover, over the past five years, multiple factors have further contributed to development of the vertical: the internet achieving the status of major advertising medium and reaching 3.88 billion users worldwide in 2017; The number of people becomes very high day by day in connecting and spending more time online; Additional devices (such as mobile phones and televisions) are able to provide further internet connectivity. The rapid technology development and the rise of new media and communication channels are just some of the forces that have tremendously changed the advertising business landscape to the point we experience it nowadays.

2.2.1. DIGITAL ADVERTISING LANDSCAPE

According to ZenithOptimedia (2017) global advertising expenditure is on course to grow 4.5% to $559 billion this year (2017), up from 4.2% growth last year (2016). The main driver of advertising in the future, however, will undoubtedly come from digital advertising. Estimated digital ad spending (including mobile) worldwide digital ad spending will rise 19.1% in 2017 to reach $228.44 billion, accounting for 39.1% of total media outlays.

Digital will continue to exhibit robust growth, expanding to 49.6% of total ad investment (eMarketer, 2017). Digital's growth is primarily due to advertiser's high interest in mobile ad formats. Growing competition for mobile ad space has led to climbing prices. This year, mobile ad spending worldwide will total $142.78 billion, up 33.6% from 2016, representing nearly one-quarter of total media ad spending.

The graph below illustrates the trend in the market and the expected growth rates for the years to come:

Graph 2: Digital Ad Spending Worldwide, 2016-2021

(billions, % of change and % of total media ad spending)
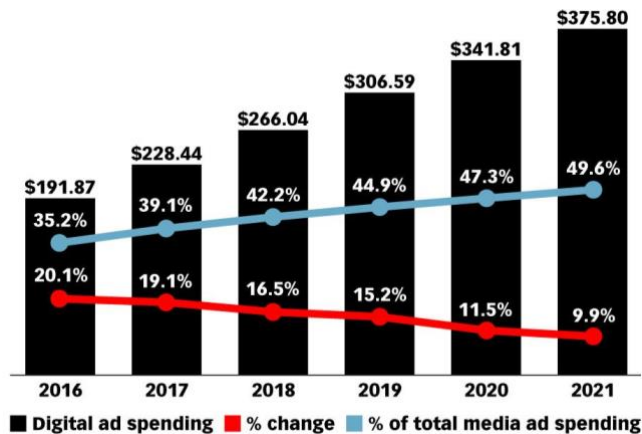
Source: eMarketer, September 2017

By the end of the estimation period, digital will have overtaken the TV advertising market, which is expected to represent 178.3 billion EUR in 2020, with an average 2.6% annual growth rate. One of the reasons for this gain in traction of digital advertising is the changing consumer behavior surrounding the Internet. The ubiquity of Internet devices such as smartphones and tablets as well as the traditional PC allows for multi-screen Internet access, helping to increase Internet penetration and is also pushing user behavior from traditional content generation to more user generated contents. In fact, the disparity in growth rate between digital and traditional media will hold true in every region. While each region's digital media market is at differing levels of maturity, increasing advertiser competition—especially for ecommerce shoppers and buyers—will drive digital spend.

For a better understanding of the industry, it's also relevant for the reader to understand different advertising formats available on the market. Interactive Advertising Bureau (IAB) divides the digital advertising into 3 main categories:

1) Paid-for-Search advertising: Fees advertisers pay Internet companies to list and/or link their company site or domain name to a specific search word or phrase (includes paid search revenues)." As this form of advertising often happens before the person searching makes a purchase, this is the form of advertising most valued by advertisers (e.g. user searching for a hotel, plane ticket, product, etc.)

2) Classified advertising and directories: A form of advertising which is particularly common in newspapers, online and other periodicals which may be sold or distributed free of charge. Classified advertising is called such because it is generally grouped under headings classifying the product or service being offered (headings such as Accounting, Automobiles, Clothing…) and is grouped entirely in a distinct section, which makes it distinct from display advertising. Display advertising typically contains graphics or other art work and which is more typically distributed throughout a publication adjacent to editorial content.

3) Display advertising: A form of online advertising where an advertiser's message is shown on a destination web page, generally set off in a box at the top or bottom or to one side of the content of the page" (examples include banner ads, online video ads, pop-ups, etc.)

The split between the different formats and their forecasted growth are represented in the following figure:

Figure 6: Digital Ad Spending Worldwide, by Format 2017-2020
(billions and % change)

	2017	2018	2019	2020
Display	$97.2	$109.4	$122.9	$137.3
—% change	-	12.6%	12.3%	11.7%
Paid search	$88.1	$96.3	$104.0	$111.2
—% change	-	9.3%	8.0%	6.9%
Classifieds	$17.7	$19.0	$20.4	$21.7
—% change	-	7.3%	7.4%	6.4%
Total	**$203.0**	**$224.7**	**$247.3**	**$270.2**
—% change	-	10.7%	10.1%	9.3%

Source: Zenith, "Advertising Expenditure Forecasts December 2017"; eMarketer calculations, 2017

Another thing worth looking at is the distribution of revenue among the biggest players in the market (Figure 7). Google is currently holding more than 30% of it and its position is supposed only to strengthen.

Figure 7: Net Digital Ad Revenues Worldwide, by Company, 2016-2020

	2016	2017	2018	2019	2020
Google	$62.59	$73.70	$84.69	$94.49	$104.39
—YouTube	$5.58	$7.80	$9.13	$10.50	$11.76
Facebook	$26.89	$39.94	$48.85	$57.61	$66.89
—Instagram	$1.90	$4.29	$8.06	$12.32	$16.98
Alibaba	$11.86	$18.06	$24.35	$30.89	$37.61
Baidu	$8.01	$9.39	$11.18	$13.08	$15.03
Microsoft	$4.31	$6.13	$8.16	$10.36	$12.76
—LinkedIn	$1.16	$1.30	$1.47	$1.63	$1.78
Tencent	$3.72	$5.48	$8.12	$11.45	$14.89
Oath	$1.41	$4.62	$4.75	$4.84	$4.92
Amazon	$1.40	$2.13	$3.37	$4.99	$7.21
Twitter	$2.25	$2.11	$2.22	$2.38	$2.52
Sina	$0.83	$1.26	$1.66	$1.99	$2.23
Snapchat	$0.34	$0.71	$1.36	$2.52	$4.53
Pandora	$1.07	$1.07	$1.08	$1.10	$1.14
Sohu.com	$0.87	$0.85	$0.91	$0.96	$1.01
Yelp	$0.63	$0.73	$0.85	$0.99	$1.13
IAC	$0.86	$0.82	$0.81	$0.81	$0.82
Yahoo	$3.01	-	-	-	-
Other	$62.04	$65.25	$70.92	$77.96	$80.25
Total digital ad spending	$192.06	$232.27	$273.29	$316.42	$357.31

Source: Company reports; eMarketer, March 2018

2.2.2. VALUE CHAIN

The value chain in the digital advertising is relatively straightforward and can be represented as following:

Figure 8: Simplified advertising ecosystem

Source: Author

The advertiser is defined as a person, organization or company that places advertisements in order to target customers and possible trigger in them the willingness to purchase. Advertisers are motivated by getting the best ROI on their ad investment but amongst larger advertisers some other motivations might kick in such as making sure that committed ad budget for a quarter actually gets spent (so that budget isn't cut the following quarter). Their marketing objectives will likely be a mix of brand marketing (raising general awareness) and direct response marketing (getting someone to actually buy something online now).

The advertiser can choose whether to interact directly with the publisher providing the advertising platform or to address an agency. The reasons and benefits to establish this kind of collaboration are numerous, the most important being:

- Lack of knowledge and necessary resources within the company
- Substantial time savings as the implementation part is fully done by the agency
- Access to experienced professionals and product betas

The idea that brands and their agencies would work together to set a digital campaigns key performance indicators (KPIs) would seem a given. But beyond that, things get harder to reconcile. A recent survey of senior brand marketing and agency professionals in France, Germany and the UK found little consensus about what campaign KPIs should be. Unsurprisingly, these differences complicate the advertiser-agency relationship.

The agencies can be mainly categorized into the following groups:

- Creative agencies: in charge of anything from designing an animated banner to filming a 30- second TV ad
- Media agencies: Strongly digital-oriented and performance-driven; responsible for media buying for displaying the ads
- Traditional media agencies: big media houses that try to combine digital with traditional means such as TV or radio

The last player in the value chain, the publisher, is undoubtedly the one with the higher degree of power and control as he is the creator of advertising inventory. By building websites or software apps or video games or e-mails which are seen by lots of people, and inserting ads into these environments, publishers create a constant stream of ad inventory which, of course, they are looking to sell to advertisers. Agencies and networks merely help the process along.

2.3. ARTIFICIAL INTELLIGENCE APPLICATIONS IN DIGITAL ADVERTISING

Many sources of data suggest that the artificial intelligence technologies are finding more and more applications in the field of digital advertising. In this section, we will explore concrete solutions that are currently being adopted in the advertising industry and look closer at the disruption they created.

Already in 2009, Casillas and Martínez-López concluded that the AI discipline offers real opportunities for advancing the analytical methods and systems used by firms to manage a variety of marketing issues. Furthermore, well-conceived and designed intelligent systems were expected to outperform statistical-based supporting tools in complex, qualitative and/or difficult-to-program marketing problems and decisional scenarios.

Developing and applying ad-hoc intelligent systems, due to their particular strengths, to process data and provide valuable information either with a data-driven or, especially, with a knowledge-driven approach, might be of interest to managers in their decision-making.

Although there are still many uncertainties and shady areas surrounding the advent of AI technologies and the future of the online marketing industry, advertising will account for 8% of AI Revenue Share in 2025 (Graph 3).

Graph 3: Artificial Intelligence Revenue Share by Industry, World Markets: 2025
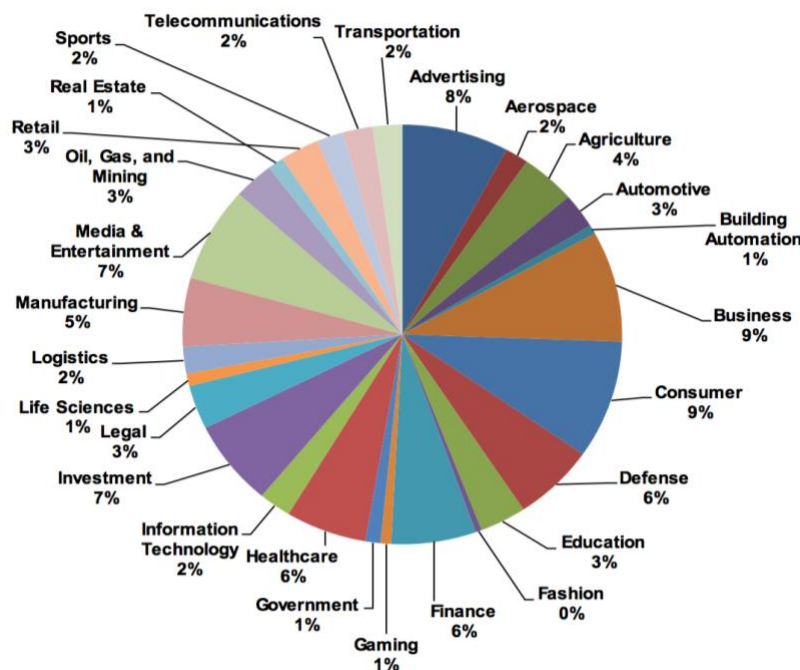
Source: Tractica

2.3.1. ENHANCING EXISTING PLATFORMS

When it comes to advertising, it all boils down to tapping into consumer markets, finding out what makes them tick, and processing that information in order to create convincing and effective ad campaigns. However, despite the fact that most marketers and advertisers deal with large amounts of data, in many cases they are unable to analyze it and most importantly to make relevant conclusions about of it. Since AI can gathers almost limitless data and categorizes it neatly, it emerges as a perfect solution for designing relevant and personal ads in real time.

The following AI-based solutions have been implemented by large tech giants that keep bringing value not only to them but also to the advertisers:

1) Automated Bidding

All the advertisers want to win an ad auction, but only at the right price they are disposed to pay. In the traditional setting, during the set-up of an ad campaign, the company owner is asked to define that price that will become his bid. This way the customer would always have control over the so-called "maximum-cost-per-click" (CPC), however due to the lack of information regarding the competition's strategies and market trends the bid might lead to lost impressions. In other words, the ad will only reach a limited number of people in the pool of the targeted audience.

With the automatization of the bidding strategies, the system takes the heavy lifting and guesswork out of setting bids to meet company's performance goals. In fact, this kind of solution uses advanced machine learning to tailor the right bid to each and every auction. It factors in a wide range of auction-time signals including device, location, time of day, remarketing list, language, and operating system to capture the unique context of every search.

From the implementation point of view, the advertiser has still the chance to define the metrics for the campaign performance such as for example: Target CPA (cost per acquisition/cost per lead) or Target ROAS (Return on Ad Spend goal).

All in all, by choosing this type of bidding strategy, the user can give up on ongoing data analysis and bid adjustment and focus on more strategic decisions.

2) Audiences

Back in the 2008 Nasco and Bruner found that the relevance of the message to the recipient is a key factor associated with the effectiveness of digital advertising. Consistent with this assertion, Carroll et al. (2007) found that consumers are more likely to be accepting of messages when the content is relevant to them.

The analysis performed by algorithms owned by advertising giants aim at analyzing millions of data points regarding the audience in order to develop patterns for the right targeting solutions. In other words, by knowing exactly who the recipient of the ads is, the advertisers have a powerful tool to reach people based on their specific interests as they browse pages, apps, channels, videos, and content across the websites.

Recommendation Engines, for example, are great for filtering and to ensure that the consumer gets to see the data that is relevant for his taste, his style and preferences. Largely used in the e-commerce ("Customer who bought this item also bought...") finds its application on YouTube as well ("Recommended Videos").

Talking about concrete examples, we can outline customer intent list: To make finding the right people easy, Google uses machine learning technology to analyze your existing campaigns and auto-create custom intent audiences. These audiences are based on the most common keywords and URLs found in content that people browse while researching a given product or service. This AI-driven solution is especially useful for performance advertisers who thanks to the custom intent audiences can go beyond pre-defined audience categories and reach people as they're making a purchase decision.

3) Creative Dynamics

Advertisers often use multiple creative formats in their digital campaigns to target and retarget consumers with product-based messages and price incentives. These include static formats (e.g., GIF, JPG) that offer neither animation nor interactivity; simple Flash formats (e.g., SWF) that offer animation but no interactivity; and rich-media formats (e.g., HTML, Java) that offer both interactivity and animation, with elements such as sound, video, floating images, and screen takeovers. As a result, advertisers have the nontrivial task of jointly assessing the effects over time of design elements available in the large number of such formats as they decide on budgets, message objectives, and consumer targeting (Bruce, Murthu & Rao, 2016). There is, however, some evidence from industry studies that ad format

size, location, and creative elements such as color, interactivity, and animation may all independently influence engagement (e.g., Cole, Spalding, and Fayer 2009; DoubleClick 2009). Yet this evidence raises difficult questions. For example, a retailer may still wonder whether product-based content or price incentives would be more suitable message content for animated and static ads; or which ad formats and message are more effective for retargeting, the canonical tactic of tracking visitors to a firm's site and then serving the firm's ads to them when they visit other sites (Lambrecht & Tucker, 2013).

There is another point brought up by the academic research that claims that new media advertising approaches that incorporate interactivity are more successful than those that do not. For example, Dickinger et al. (2004) found interactivity related to more effective ads. Similarly, Jelassi and Enders (2005) found advertisers that incorporated interactivity achieved higher success. Given the greater capacity of new media to fully engage consumers, it is important that advertisers incorporate interactive approaches if they want to maximize success.

The automation in the creation of the ads is about to solve the above-mentioned uncertainty for good. Ideal for advertisers with a well-developed website or a large inventory, Dynamic Search Ads use their website to target the ads and can help fill in the gaps of the keywords-based campaigns. When someone searches on a search engine with terms closely related to the titles and frequently used phrases on the advertiser's website, the advertising platform will use these titles and phrases to select a landing page and generate a clear, relevant headline for the ad.

Exact same principle is applicable for ads in the previously described display network. Dynamic display ads show customers personalized content from a product feed the customer controls and attaches to the campaign. The ads show the new products, services, or promotions from your feed. Therefore, these kinds of ads are not only displaying to the customer the products or services he/she showed interest for, but can also automatically adjust their size, appearance, and format to fit just about any available ad space. For example, a responsive ad might show as a native banner ad on one site and a dynamic text ad on another, as it automatically transforms itself to fit precisely where it needs to go to meet advertiser's marketing goals. Main benefits of dynamic responsive ads are without doubts an increasing reach and impact together with substantial time savings.

4) Data-driven attribution models

In digital advertising, attribution is the problem of assigning credit to one or more advertisements for driving the user to the desirable actions such as making a purchase (Shao, 2011). Rather than giving all the credit to the last ad a user sees, multi-touch attribution allows more than one ads to get the credit based on their corresponding contributions. Multi-touch attribution is one of the most important problems in digital advertising, especially when multiple media channels, such as search, display, social, mobile and video are involved. The attribution problem focuses more on accurate and stable interpretation of the influence of each user interaction to the final user decision rather than just user classification. While traditional classification models fail to achieve those goals, the tech giants are becoming pioneers in the field.

Data-driven attribution is different from the other attribution models, in that it uses advertiser's conversion data to calculate the actual contribution of each keyword across the conversion path. Each data-driven model is specific to each advertiser. By comparing the click paths of customers who convert to the paths of customers who don't, the model identifies patterns among those clicks that lead to conversions. There may be certain steps along the way that have a higher probability of leading a customer to complete a conversion. The model then gives more credit to those valuable clicks on the customer's path. This solution gives the customer the possibility to properly evaluate conversion data, and to see which ads have the greatest effect on business goals. Moreover, if used in combination with an automated bid strategy to drive more conversions, the bidding will use this important information to generate more conversions.

2.3.2. CREATING NEW OPPORTUNITIES

The adoption of the AI-based solutions not only allow to enhance the already existing platforms but also brings along a proliferation of new opportunities and business models opening up in the market. Whereas static banner ads dominated initially, search advertising now encompasses the largest part of global online advertising spending (Varian, 2007). In recent years, a new form of online advertising, real-time advertising (RTA), has been increasingly used. RTA, called also programmatic advertising, is based on auctions in which individual advertising spaces are sold within a few milliseconds after calling a website.

In programmatic advertising algorithm analyzes consumer's behavior able to predict who in the audience is most likely to convert and to optimize the campaign towards this specific segment. The experts predict that RTA will progressively replace the traditional forms of purchasing online advertising space, which nowadays is being sold in large quotas and at predetermined prices that are mediated by marketers and media agencies. Thus, from the perspective of publishers, RTA allows both a reduction of transaction costs and an increase in revenues due to higher utilization. Advertisers can target ads based on the product affinity of user groups, which allows for the optimization of advertising campaigns in a short period of time (Ghosh et al. 2009).

According to IAB UK senior programmers manager, Dee Frew it's impossible to tell what portion of advertising is now traded programmatically, but it's definitely on the rise. Some agencies now say they're eager to buy as much media as possible through programmatic channels, and some major brands have even built out in-house teams to handle their programmatic ad buying as they spend more of their marketing budgets that way. eMarketer gives us a good overview of the market trend:

Graph 4: Programmatic Ad Spending Worldwide, 2012-2019
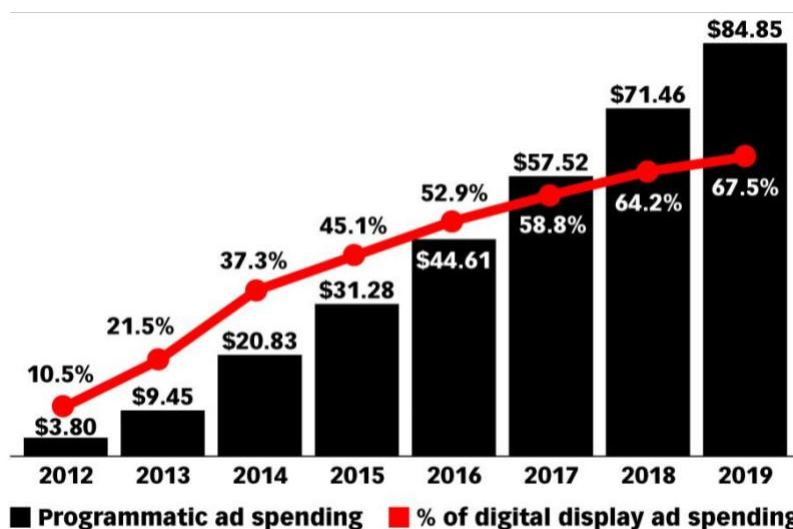
Source: Zenith, "Programmatic Marketing Forecasts 2017", Nov 2017

Moreover, the digital opportunities that seem to be viable in the upcoming decade are machine vision, allowing the user to search for a given product by simply snapping the picture of the desired item, consumer segmentation with the use of machines learning from user behavior and content generation within seconds – just to mention a few.

3. RESEARCH PROBLEM AND METHODOLOGY

3.1. RESEARCH PROBLEM

This thesis intends to outline the impact of the artificial intelligence in the digital advertising industry. After reviewing the relevant literature concerning the topic, the author gathered primary data to answer the following research question (Q1), further supported by three sub-questions (Q1.1-Q1.3):

Q1: What are the implications of the introduction of artificial intelligence in digital advertising?

- Q1.1: What are the artificial intelligence features used today in online advertising?
- Q1.2: What are the main advantages and disadvantages of AI-based solutions in advertising?
- Q1.3: How does the AI affect incumbents within the digital advertising?

3.2. METHODOLOGY

There is much literature which advises the use of multiple methods rather than just focusing on one (Jick, 1979). Deciding on the most adequate methodology for this thesis was a thought-through process since both qualitative and quantitative methods have individual strengths that would have brought added value to this dissertation. Combining the above-mentioned strategies usually helps leveraging on the advantages of both, but finding metrics for a quantitative research in this specific topic proved unsuccessful. Witt (2001) defends that using both methods might not be the best solution, since they "differ strongly in their objectives and analysis, and therefore, they cannot be combined or reconciled that easily".

Since the author was not trying to make standardized and systematic comparisons that are characteristic to the quantitative study, a qualitative method was chosen. In fact, the aim of the study was to rather explore the complex set of factors surrounding the central phenomenon and present the varied perspectives or meanings that participants hold (Silverman, 2005).

The method chosen consisted of semi-structured interviews that gave participants the opportunity to respond more elaborately and in greater detail than is typically the case with quantitative methods. In turn, the author had the flexibility to tailor subsequent questions to information the participant has provided. One advantage of qualitative methods in exploratory research is that use of open-ended questions and probing gives participants the opportunity to respond in their own words, rather than forcing them to choose from fixed responses, as quantitative methods do. (Mack et al. 2005). Open-ended questions have the ability to evoke responses that are:

- meaningful and culturally salient to the participant

- unanticipated by the researcher

- rich and explanatory in nature

In order to collect information to add new insights on the aforementioned research goals, the set of interview questions covered topics regarding the features of AI-based platforms, automatization, recent trends in the digital advertising, advantages for the clients and last but not least the future of the entire industry. This qualitative method allows the researcher to review the research phases several times since each phase depends on the result of the previous one (Witt 2001). In the beginning, there is only a rough understanding of the research. Based on this understanding a first plan for data collection, interviews and evaluation can be set up. According to Witt, each phase of the plan can influence the following or previous one. By running through the phases repeatedly, answers to the research question can be obtained. The conclusion will be reached when no new data can be gained (Witt 2001). The following representation sums up the entire concept:

Figure 9: Circular research strategy
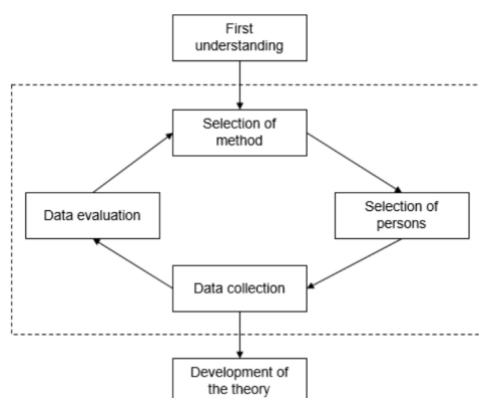
 Source: Witt, 2001

The interviews, recorded over one month, have an average duration of thirty minutes and were conducted either in person or, when not possible, telephonically. Even if the online forms would have allowed a larger sample and quicker data collection, they were excluded due to the lack of personal connection with the interviewee and impossibility to follow up and dig deeper to get satisfactory insights. In fact, every time the respondent gave a vague or general answer, the author would inquire further until satisfactory insights were gathered. The transcript of the interviews can be found in the appendix.

Once the interviews were concluded and transcribed, the author proceeded with the computer-assisted analysis of the qualitative data (CAQDAS) which allowed precise handling of text and the development of a consistent coding scheme. For this purpose, MAXQDA Analytics Pro 12 platform was chosen where the thematic analysis was performed. Thematic analysis is a widely used method for interpretation of qualitative data gathered through interviews (or other forms of qualitative research). It includes coding, categorisation and noting patterns in the collected data set. (Alhojailan, 2012) A theme, or a patterned meaning, captures important information about the data in relation to the research question, while a code represents a specific example of this patterned response from the data set. This study uses a six-stage approach to the thematic analysis (Braun & Clarke, 2006): (1) familiarize oneself with the data set; (2) generate initial codes; (3) search for themes; (4) review themes; (5) define and name the themes; and (6) produce the report.

The author familiarized herself with the depth and breadth of the data through repeated listening of the audio recordings. She listened to them actively - searching for meanings, patterns and took notes of these in the process. The author then partially transcribed a vast majority of the interviews where the relevant content was discussed. Once familiar with the data, the author generated the initial codes which captured the most interesting and meaningful information mentioned in the recordings and transcripts. Codes refer to "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, 1998). The codes helped the author indicate the context of the conversations and prepare the data for categorisation. As the third step, the author analysed the codes by sorting them into categories to form overarching themes. When done with the initial categorisation, the author reviewed the themes, looking for inconsistencies. When applicable, the author also identified any sub-themes, which gave more structure to particularly large and complex themes. At the end of this phase, the author had a fairy good idea of what the themes were and how they fit together. At this point, the author further analysed the themes, identifying the „story" that

each theme tells and created theme names which captured the essence of the discussions in a concise manner.

As the final step, the author wrote up the complicated story of the data in a way which is convincing the reader of the validity of the analysis. To provide evidence of the themes, the author used vivid examples which capture the origin of the demonstrated point.Throughout the write up, the author made sure the narrative goes beyond description of the data, making arguments in relation to the research questions.

3.3. SAMPLE SELECTION

The concept of purposeful sampling is used in qualitative research. This means that the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study (Creswell, 2007). Purposive sample sizes are often determined on the basis of theoretical saturation (the point in data collection when new data no longer bring additional insights to the research questions). Purposive sampling is therefore most successful when data review and analysis are done in conjunction with data collection. (Mack et al. 2005).

In order to get access to experts in the field that could enrich the study, the snowball sampling method was chosen (also referred as chain referral sampling). In this method, participants or informants with whom contact has already been made use their social networks to refer the researcher to other people who could potentially participate in or contribute to the study (Mack et al. 2005). For greater reliability, the minimal criteria to be selected for the interview included:

- at least 3 years of experience in digital advertising
- exposure to different stakeholders in the value chain
- no personal or professional connection with the interviewer

The potential interviewees were first contacted either via email or telephonically, expressing my interest in collecting their personal experiences and observations in my thesis. We then set up an appointment, at the beginning of which we had a general chat about the industry before jumping into the script questions. The very first question posed to almost all the interviewees was about their role and responsibilities that helped placing them in the right

place in the industry value chain. At the end of the interview, the respondents were asked to refer potential informants who could further contribute to the research. The following sampling tree (also known as stemmata) is a static depiction of a dynamic sampling process that took place:

Figure 10: Sampling tree
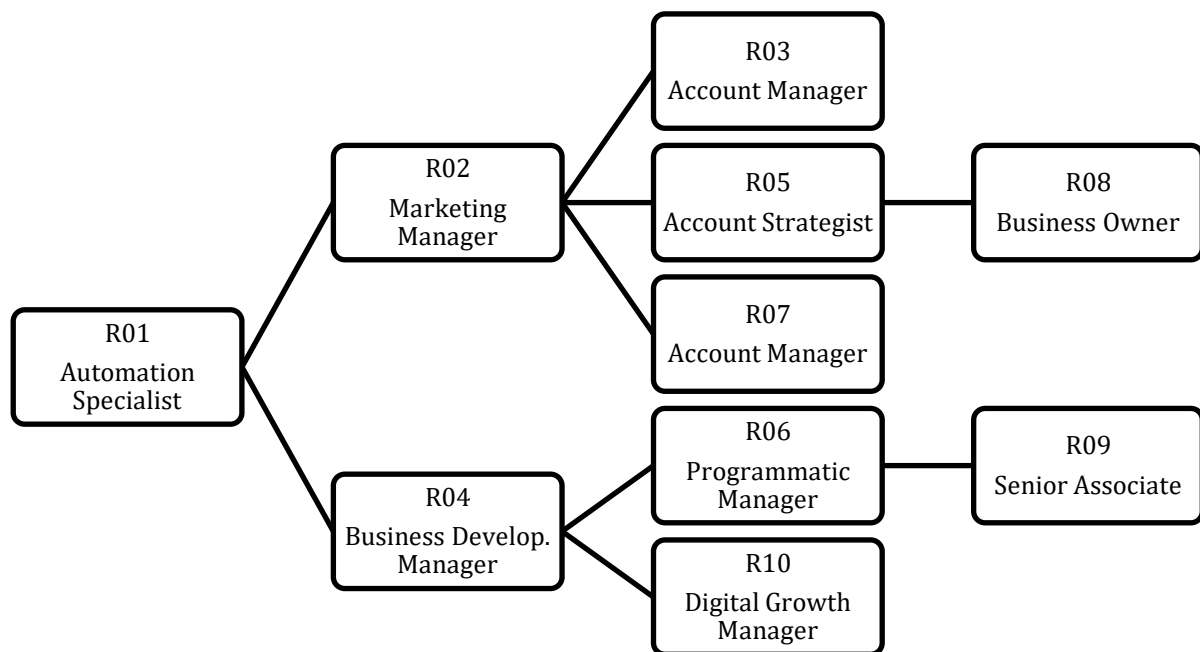
As mentioned in the theoretical part, when we look at the value chain there are different players in the digital advertising industry. Figure 11 provides the reader with an overview of the respondents, including their role and the type of company they represent. As we can see, the interviews provided almost a full coverage of the different agencies that operate in this vertical as well as a couple of final customers (advertisers).

Figure 11: Respondents' overview

Respondent	Role	Company	Interview format
R01	Automation Specialist	Tech company	In-person
R02	Marketing Manager	Large retail company	In-person
R03	Account Manager	Traditional Media Agency	In-person
R04	Business Development Manager	Tech company	In-person
R05	Account Strategist	Digital Agency	In-person
R06	Programmatic Account Manager	Programmatic Company	In-person
R07	Account Manager	Creative Agency	In-person
R08	Business Owner	Privately owned small company	In-person
R09	Senior Associate	Technology Advantage Practice - Consulting	Written
R10	Digital Growth Manager	Tech company	In-person

Source: Author

The author stopped contacting additional informants at the point when a theoretical saturation was obtained.

3.3. STUDY LIMITATIONS

Although this study provides insights into how the artificial intelligence is influencing the digital advertising industry and all the different stakeholders in the value chain, it also has some limitations in both primary and secondary research that are important to highlight.

The first limitation regards the availability of resources for the secondary research. The data collected is limited to the available free online data and studies, both obtained from recognized institutions, EBSCO search engine facilitating academic papers, and Google large public available database and sources. This study could have been developed slightly further obtaining access to private sources of information and the know-how of the companies operating in the industry. However, the insights and findings for this part have satisfied the demanded goal of the thesis.

Secondly, the practical part of this thesis is based on a qualitative research conducted through interviews with a very limited sample. The major limitations of this study source from restricted ability to generalise the results due to the character of qualitative research method employed in the study. Although the results of the study cannot be generalised outside the sample, they serve the purpose of getting insights about specific segments of members operating in the digital industry.

Additionally, the social factor can hold the participants from expressing their honest opinions, especially when they are in opposition or afraid of disappointing the interviewer (Holloway, 2005). The social desirability bias is one of the recognized types of measurement error and occurs when a respondent provides an answer which is more socially acceptable than his / her true attitude or behaviour. In connection with the qualitative study performed, the respondents could have map their response onto the scale and may have edited it in order to make themselves look more favourable.

Lastly, conclusions suggested in this paper could benefit from further testing via a large-scale quantitative study that would either confirm or disprove the applicability of the research and the correctness of conclusions.

4. SUMMARY OF KEY FINDINGS

4.1. Artificial intelligence features used today in online advertising.

The interviews revealed several online advertising platforms already use machine learning to improve their services. The changes in the system are noted by the users who very often see an impact not only on the tasks they perform on daily basis but also on the scope of the job. There is a large overlap between the solutions described in the theoretical part and those mentioned by the respondents, therefore the following section will mirror the list from chapter 2.3:

1) Bidding

The respondents refer to the manual bidding as monotonous and time-consuming action that used to be the core of their job when setting up an online marketing campaign.

"At the beginning, we would really go into detail about bid per keyword, effectiveness per keyword, per creative, per campaign sometimes you would have to spend 1-2 hours on every account checking the performance and changing bids. [...] Because everything was done manually it was difficult to find the root of the problem. If something went wrong we would have to check all the change history and it was very time consuming and obviously my productivity was much lower compared to now." (R05)

"It took us quite some time effort and money to do that. And I had to do it on my own without experience so it's really took me quite some time. I had to rely on online materialis and some tutorials and teach myself how to do stuff. [...] I was also asked to set the bids, but I had no idea how high should they be so it took some time until we've got to reasonable bids" (R08)

During the interviews, the author could clearly perceive frustration in people's voices when talking about the manal bidding and on the other hand, a sense of relief when they had to elaborate on what happened after the automatization of this process. Apparently this upgrade allowed the account managers to focus on other projects while the final clients could maximize their results:

"So right now we are doing more of a scale up overview. So for example once that we know that the return on ad spend is working properly we just need to overview the entire process and react in case they are shifts in our client's strategy. This gives us a lot of time for experimenting with new campaigns and new solutions". (R05)

"One of the most important features that we have is automated bidding. Whenever you have a campaign that is into DC search there is a possibility to activate bid strategy with the automation of bidding at keyword level to reach a given objective. Given that, the client has the possibility to set the objective for a series of campaigns, the algorithm will take care of everything else so giving the perfect bid for all the set of keywords to maximize the results." (R06)

2) Audience

When discussing the impact of the AI on the audiences and targeting, the respondents focused strongly on the importance of personalization that consists of delivering individualized content to recipients through data collection, analysis, and the use of automation technology.

"We truly believe that personalization is the key of success and in order to be able to do that in digital world we had to rely on automated solutions" (R02)

"The second [trend] is the increasing importance of personalization. With so much data being generated about individual consumption patterns, it is now possible for marketeers to highly customize messaging to the individual." (R09)

"The bids setting and targeting are mostly done automatically, the creations are still mostly by manual input." (R05)

The interviewees were also able to elaborate on the main advantages of personalization and advanced strategies for targeting the right audience.

"It allows us and the brands to directly transfer the massive amount of data into the final products for example targeting solutions that can be easily applicable to marketing strategies." (R04)

"Who your customers are, which groups of customers are the most important in terms of revenue in terms of the loyalty and you could then diversified a communication or the whole marketing tactics based on those segments". (R04)

3) Attribution model

The attribution model was the least mentioned topic during the discussions possibly because of its complexity. Nevertheless, when properly implemented, the AI-based attribution model can help in analysing the signals the users send regarding their interest and purchase intent and therefore, distribute the conversion credit in a smart manner.

"Talking about taking advantage of the automation in the development of our company, we have developed tailor-made attribution model. It is different from what it's currently on the market and it allows us to focus on analysing signals from other media and then adapting the model to our clients' needs." (R03)

"Once we've created the model they're tweaking it with the help of the AI and machine learning for it to give us the recommendations about which brackets of customers we should be more on as well as the ones that are not profitable." (R02)

4) Programmatic

The respondents admitted that programmatic is a big topic on their agenda for the years to come and that either themselves or the companies they collaborate with are planning big investments in that direction.

"Definitely everything is going towards programmatic, so it's not only my company, my agency but also a lot of our clients that declare that they want to become fully programmatic eventually. [...] We have the goal of being fully programmatic until the end of 2019." (R03)

"I think it's going to be automated. We will only set the goals for the campaign, provide creatives and the system will do the rest. It will be based on all the data collected throughout the years and it will be able to react to all the market signals in a second whereas our team would have employed hours to do the same type of work." *(R02)*

"If I think of digital advertising, we can categorize our customers in 3 groups: we have these really really small advertisers who do everything manually, we have a mid-market segment that is trying out the automation and then we have programmatic advertising which is fully automated and totally algorithm-based. And in my opinion in 5 years it's going to be just the programmatic and just the small customers and nothing in the middle." *(R01)*

Despite the great benefits connected with the wider spread of the programmatic advertising, the respondents are also aware of the obstacles one may encounter when thinking about the implementation of this kind of solution. Those may include, but are not limited to, the expenses connected with programmatic as well as lack of inclination towards automated advertising.

"To be completely honest I work very little with programmatic because it's just too expensive." *(R05)*

"Mainly what I see when you ask me about different clients is their mindset. So it doesn't necessarily mean that the size of the company determines what kind of approach they have. It's really about how they look at the automation." *(R10)*

4.2. Main advantages and disadvantages of AI-based solutions in advertising.

As every great invention out there, the artificial intelligence brings along a series of advantages combined with a balancing amount of disadvantages. This section of the chapter will aim at categorizing and outlining the positive as well as negative sides of the AI-based systems implemented in advertising.

1) Advantages

One of the most frequent topics that came out during the discussions with the experts, was the **time saving** caused by the automatisation of certain parts of the system (such as bidding, targeting discussed previously). Looking at the below extracts from the interviews we can conclude that the time saving is definitely one of the main advantages that the users observed.

> *"What we've seen is that we are we're definitely cut more cost efficient by saving time and investing only in media that drive our sales ."(R02)*

> *"So on one hand it's helping a lot because it's less time consuming on the other hand, it's totally different from the way we learnt it […] Automation gave me a lot of free time and it works well so yes I'm happy." (R08)*

> *"All those things we would spend hours and hours trying to figure out what exactly we need to do. well automation and machine learning which in the end is processing huge amount of data could help us with" (R10)*

The second strong theme that emerged from the interviews in connection with the benefits of AI is **cost effectiveness.** Once the manual work is eliminated, people dealing with digital campaigns have more time at their disposal which leads to financial benefits for entire organisations.

> *"One is that in order to be cost effective and in order to keep up with the market you have to start engaging with automation [..] Automation makes all the operations more cost effective. You don't have manual, tedious work." (R01)*

> *"Cost efficiency: Tech giants are working tirelessly to increase the benefit (revenue generated) of advertising while at the same time bringing down cost by using smart automation tools, AI and generally benefiting from network effects as companies from across industries flock to advertise online." (R10)*

2) Disadvantages

When talking about the less positive sides of the AI, the respondents bring up the **complexity** of the solutions that in some occasions might be difficult to grasp or to explain.

> *"There was also a bit of communication challenge when talking about these matters because our customers do not only have digital marketing they have TV, newspapers, radio everything so in order to be able to convey your message you have to be able to simplify it." (R05)*

> *"After a few years they kept adding more and more features so I got more complicated. What we are seeing right now is that there are a lot of options that are hard to grasp." (R08)*

Moreover, there seems to be a concern regarding the **data** that needs to be fed into the system. Since the initial data is essential for the proper functioning of the AI-based features, even a smallest error at this stage might lead to the wrong results or even worse, to the financial losses.

> **"***One, people don't know what the machines would do and the machine could always break. Let's also not forget that if you feed the machine with incorrect data, things are going to break. So before moving toward AI you really need to make sure you have a good understating of your business and the data you need." (R01)*

> *"Sometimes the error lies on our side as well: we set the bid too high or too low." (R05)*

4.3. The effect of AI elements on incumbents within the digital advertising.

The changes that the introduction of automation and machine learning in the digital advertising provoked go beyond the shifts in day-to-day job of people working in the field. As we will discover in the following lines, the effects of AI elements provoked the job

redefinition, shift of control in the advertising value chain and revaluation of advertisers' priorities.

1) Job redefinition

All of the interviewees mentioned the impact of the AI on the job market that can be summarized in three stages. At the very beginning, we can observe that some of the **roles disappear**:

"A lot of people that I used to work with don't have roles anymore because what we would have seen was that they would be the people changing the bids and keywords or they would be the people changing our creatives and AI and automation completely took away all of that." (R01)

"I: Any dark sides?
R: We had to fire people. Apart from that I cannot see any.
I: What happened with all those people if I may ask?
R: It's happening because some of the roles we had are obsolete now and with the use of technology we could make a better use of our internal resources." (R02)

"What I think is that people who are doing the jobs will no longer have any work to do and this is something that every company in the industry should consider." (R01)

"I think that entry level SEM people will not really have existence anymore [...] there will be less people working in this field and there will be only some kind of few specialist, very technical who will be just supervising how the whole campaign is going and rather reacting." (R03)

"In the long term, I'm pretty sure that will still have the creative agencies and there will still be people working in there but there will be less and less of that." (R07)

"Usually every big change in industrial revolution causes a loss of jobs" (R10)

The second stage regards the people who stayed in their role despite the disruption but who need **repurposing or upskilling** in order to keep up with the change. This process is extremely important especially for the business owners who need to take decisions about their human resources.

"Our kind of idea is that these people will be repurposed and will be doing more creative work and look at what's the strategy of the company or where is the marketing direction going and in some cases that happened and in most cases it didn't. And those people had to move on to different areas." (R01)

"I'd say again that the skill set is also changing. We need way more analytical people than before. They need to know much more about trafficking or different types of auctions you can have and from which media it's convenient to buy rather than only sitting in this kind of hygiene maintenance at the campaign level." (R03)

"Some of the companies decide to do some extra training to keep the resources and educate them as much more technical skills are required. Also a good understanding of the whole digital landscape including how the whole programmatic media buying is working." (R03)

"To summarize, combining the data mining, the data hygiene and the day that storytelling will become essential to translate data into insightful action points." (R04)

"The second thing there's also important is the business understanding. In digital marketing you would assume that everyone is using the same product or similar solutions so everything is the same not necessarily. And the third one is definitely if your sales sense to show them the value which I think goes in line with communication and business skills so I say combining those two so just like the sales sense understanding of what is the value for the client, what is the return on investment why would it be a good choice for them." (R10)

Last but not least, it's important to mention how in the stage three we see emerging a new role: from an account manager who manual manages the campaigns to a strategic advisor or creative director - two roles that are expected to grow in importance in the years to come.

"There is on one side, we will have creative people who will think about how to communicate the message, what language is important and what visuals and what artistics. And then on the other side you have people who are experts in programmatic." (R01)

"So previously we thought about marketing in terms of creativity and cost efficiency and that influenced ou hiring process. Now, the first thing we look at in our potential hires is analytical mindset but we keep encouraging the creative side. The best of both worlds." (R02)

"I think that people that only working in digital marketing but generally working in marketing should be more of a strategic brand advisors rather than just the people that buy media or set up campaigns. it should be transferred into a deeper conversation with the client how this could be applied and how this could open the possibilities in terms of their brand development." (R04)

"They can scale it and take the brand to a new level because they can could focus more on the strategic approach rather than in this very manual adjustments." (R04)

"So it's all about helping the clients to obtain the best results, it's really important to understand the strategic aspect, what they need, what are they goals. So I think there will be more and more focus on under strategic understanding of the client. Some more movement towards account manager as a practitioner and at that point technical knowledge of the platform and applying all the features to the client." (R06)

2) Shift of control

Most of the changes in the world come with the fear and worry about what the future is going to bring. After talking with different incumbents of digital advertising value chain, we can

conclude that the AI is creating a sense of giving up the control and passing it on to the "machine".

> *"So the overwhelming feedback is fear. "I don't want to do this", "I don't trust this", "I don't understand" so we are trying to point out to the fact that the automation will be better for the business, make it more efficient." (R01)*

> *"They also want to control everything so the main objection is normally control and better knowledge than some machine can have." (R03)*

> *"What happens, sometimes users are reluctant to pass from manual that gives them control over different aspects of a campaign do automation of that same campaign so giving full control to the machine." (R06)*

> *"I also don't want to give up the control and pass it on to the agency." (R08)*

3) Advertiser's priorities

One of the topics discussed throughout the interviews was the impact of automation on the final customer i.e. the advertiser, let it be a small privately owned company or a huge corporation. There are two trends that can be outlined in this regards: as of now, the advertisers need to move towards the automation in order not to stay behind their competition. It is the competition in fact that creates peer pressure on the market and provokes a chain effect when it comes to the implementation of the AI-based solutions.

> *"Anyone who is in the middle with the mix of automation and manual, will be obliterated or they are gonna progress into the programmatic stage or they fall back into the tiny customer work." (R01)*

> *"In the short term, the companies that will adapt first are going to win and the rest? Well, that's another story…"(R02)*

"So most of the clients that are looking to deliver performance will try to get the best using that and using automation. At that point to get the competitive parity all the other clients will have to enter into programmatic" (R06)

When asked about the future of the industry instead, the interviewees put a lot of emphasis on the creatives and the offline activities that apparently will be the differentiator in the times of full automation.

"I also think there will be a huge shift to the offline media and people that are going to be valued the most, will be people that are able to think outside of the box." (R01)

"There is nothing that makes you stand out so the only way to differentiate yourself is offline media or pop-up stores or creating some sort of branding. So I think it's going to get to the point when we have to switch back. And I know it sounds kind of intuitive but the digital will completely lose its power." (R01)

"We all use the same machine we all do the same thing for optimising but there's still a whole world that is left to an advertiser: a website and it's user experience, visibility. so this is something that is disconnected from media buying. We can try hard to redirect the client to website but the rest is in your own hands." (R06)

"Meeting consumer needs: However, probably the most important impact of AI is felt in what is, in my opinion, the key role of any good marketing function - providing feedback to improve the core product offering and meeting consumer needs in more intelligent and cost-effective ways." (R09)

"When you decide a set of rules that triggers a set of actions, it allows you to focus on business in a more strategic way rather than pull all the levers manually and do the time consuming data mining because you already have a technology to do that for you so we can focus on driving the car rather than changing the gears." (R04)

By analysing the interview responses, one might wonder how the job in digital advertising will look like and if humans will be completely substituted by machines. The

interviewed field specialist all anticipate the change that might consist of transition from media consultant, currently occupied developing marketing strategies and setting up all the parameters in the advertising campaigns to strategic consultant who will advise the clients on how to make the most of the available technologies. Before this occurs, people working in the industry hope to get significant time savings due to the automation that will allow them to focus on other business areas.

From the advertising company's perspective, it's probably a good time to start investing in dedicated trainings to set up an educated workforce able to cope with the challenges the AI technologies will bring along.

Even if the automation and machine learning are supposed to simplify the processes of ad creation and auctions, we should observe how those changes will impact the structure of the advertising ecosystem. As mentioned by many interviewee, the programmatic is probable to become the only ad exchange platform in the future and as such we can expect the value chain to tend towards the "programmatic-only" structure.

5. CONCLUSIONS

The goal of this research study was to map out the implications of the introduction of artificial intelligence in digital advertising. The theoretical part of the thesis provided the reader with a brief introduction into the artificial intelligence world, followed by a description of the digital advertising landscape, to conclude with an overview of the online marketing solutions that are already AI-fuelled. In her original research, the author talked to different stakeholders within the advertising value chain, sampled through the snowball method. The respondents comprised of representatives from agencies, tech companies and advertising firms that had at last 3 years of experience within the industry.

The author conducted the study with the aim to answer the following research question: What are the implications of the introduction of artificial intelligence in digital advertising? To be able to answer the main research question, the author further structured the problem into 3 sub-questions, which led her to a synthesis of the key implications: What are the artificial intelligence features used today in online advertising? What are the main advantages and disadvantages of AI-based solutions in advertising? How does the AI affect incumbents within the digital advertising?

Based on the research findings, there appears to be several online advertising platforms already using machine learning to improve their functioning. Tasks such as bidding or audience targeting are almost fully automated, taking away the burden from the shoulders of people responsible for running digital campaigns. The degree to which individual new media forms become important may vary, but the unique advantages of the internet allow for effective targeting of consumers and potentially allow for greater engagement of the consumer. The programmatic advertising results to be the pillar of the automation and, in the opinion of many, the only solution on which the marketers will rely in the future. It seems that the capacities of programmatic have definitely not reached their full potential yet and we will see the channels and platforms for ad delivery evolve tremendously over the next years. As a result, it is important to continue to evaluate and compile knowledge on what makes new media advertising effective.

The advantages of usage of AI-based platforms include substantial time savings and cost effectiveness: once the manual work is eliminated, people dealing with digital campaigns have more time at their disposal to invest in developing clients' relations or strategic thinking. On the other hand, the complexity of this kind solutions combined with the heavy data requirement might constitute an obstacle for the implementation and could be perceived as a negative side of AI.

As for the effects on the incumbents within the digital advertising we can outline three main trends: job redefinition, shift of control and change in advertisers' priorities.

From the study it appears that due to automatization of certain processes, some of the roles in digital advertising might disappear. People, who will be able to hold on to their positions will be the ones who undergo a process of repurposing or upskilling in order to meet the new market needs. Now, employees are required to be tech savvy and understand the digital world. In fact, we can expect a transformation of the role of account manager into more of a strategic or creative advisor, capable of making the most of digital solutions available on the market.

It's also probable that we will be able to observe a shift of control from the advertiser to the publishers or big tech companies – a passage that could potentially create a sense of fear and worry especially among small companies.

Last, but not least, the final advertisers will be impacted. In the short run, it's clear that AI early adopters are, or will, gain market advantage and rapidly move ahead of their peers who are hanging back. Even for those who haven't yet determined where AI belongs in their businesses and how to apply it, it's essential to keep an eye on this technology. In most

cases, these are still early days for AI, and many questions remain. But early adopters make it clear that business relevance and the ability to compete will increasingly hinge on working with machines to interpret and learn from data.

On the closing note, the author would like to propose some personal reflections and suggestions for members of digital advertising affected by AI. There is no piece of doubt that the artificial intelligence is and will continue to disrupt the industry and to affect its incumbents. For a positive development of the vertical as a whole, the big tech companies and publishers who are leading the way for AI implementation should bear in mind the impact their innovations are having on other stakeholders. Given the complexity of the AI-based products, they might consider assuming an educative role towards the advertisers. By taking this step, the tech firms could assure a smooth roll out of their initiatives and the advertisers would gain a better understanding of the platforms they are using and bigger independence.

As for the account managers responsible for digital campaigns, it is important to stay informed and up-to-date about the changes in the industry. This should allow them to develop necessary skills and capabilities right at the moment when they are required. Ideally, the new innovations will free marketers from their busywork, allowing more time for creativity and thoroughness.

6. GLOSSARY

- Ad network: A system that aggregates ad inventory from web publishers and app developers to efficiently match the inventory with advertiser's demand

- Ad exchange: A technology platform that facilitates the buying and selling of remnant ad inventory that can be bid on in real time

- Advertiser: An organization that wants to get its message to the right audience, efficiently and effectively

- Conversion: An action that's counted when someone interacts with the ad (for example, clicks a text ad or views a video ad) and then takes an action that the firm defined as valuable to their business, such as an online purchase or a call from a mobile phone

- DSP: "Demand-Side Platform", a platform that enables advertisers to manage all ad exchanges through a single interface

- SSP: "Supply-Side Platform", a platform that enables publishers to manage and sell all its ads inventory through a single interface

- Publisher: An organization looking to maximize the monetization of its space

- RTB: "Real-Time Bidding", a means by which advertising inventory is bought and sold on a per-impression basis, via programmatic instantaneous auction, similar to financial markets

7. LIST OF FIGURES AND GRAPHS

- Figure 1: Artificial Intelligence Tree source: Forseter Research Inc
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- Figure 3: Gains from the implementation of Machine Learning, MIT Technology Review, 2017
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- Graph 4: Programmatic Ad Spending Worldwide, 2012-2019 Source: Zenith, "Programmatic Marketing Forecasts 2017", Nov 2017

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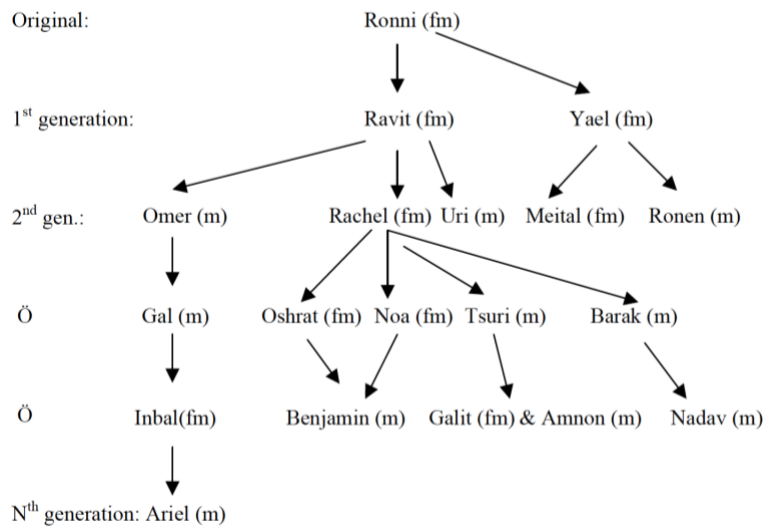
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9. APPENDIX

9.1. Snowball tree example

Source: International Journal of Social Research Methodology

9.2. Interview transcripts

Respondent's reference: R01
Role: Automation Specialist
Sector: Tech company
Interview format: In-person

I: Good morning, thank you for finding time for this interview. Before we jump into the discussion, I would like you to tell me a bit more about you role.
R: As a product specialist my main aim is to talk about attribution and measurement and how people use this to their advantage.
I: When you look at your role, how do you feel it is being influenced by AI, if influenced at all?
What we saw happening is that previously I built manual campaign for people or suggested manual bidding and manual targeting but what we started to see was with AI and algorithms everything started becoming automated. So I transitioned from looking at people's data and providing specific recommendations to putting the data in and letting the algorithm do it. That means that a lot of people that I used to work with don't have roles anymore because what we would have seen was that they would be the people changing the bids and keywords or they would be the people changing our creatives and AI and automation completely took away all of that.
R: What happened to all those people?
Our kind of idea is that these people will be repurposed and will be doing more creative work and look at what's the strategy of the company or where is the marketing direction going and in some cases that happened and in most cases it didn't. And those people had to move on to

different areas. So the companies that were not that advanced or are not using AI wouldn't have job anymore. So in a lot of cases other companies were not prepared to upskill people and were not prepared for the revolution that was going to happen and that of course had an impact on the employees.

I: Can you walk me through the automation process? Was it a top-down approach or did the advertisers have the chance to opt-out?

R: Essentially it came from two parts. One is that in order to be cost effective and in order to keep up with the market you have to start engaging with automation. As an advertiser, you might be at risk of losing your business. So it came from two areas. One is that you have to stay on top out of the crowd and trying to keep up with the competition, implementing this kind of solution would lead to a competitive advantage. So within agencies, for example, that's totally coming from a management perspective so people who actually do the advertising creatives have no choice whatsoever. The approach is top-down and that's totally dictated by the market and if those people were not able to adapt their skills they wouldn't have a place anymore.

I: Since you help out the advertisers with the automation processes, what is the feedback you have received so far?

R: So the overwhelming feedback is fear. "I don't want to do this", "I don't trust this", "I don't understand" so we are trying to point out to the fact that the automation will be better for the business, make it more efficient. Unless you are talking to the senior person in the company who agrees absolutely, "let's do this", "this is better for my business", anyone who actually is in charge of the changes will be completely held back. We would take months and months to convince them to move over to AI, to move over to an algorithm. In some extreme cases up to 2 years to make them use automation and start trusting. Number one is panik "I don't know what is going to do to the business". That's from the implementation side. The C-level or senior people are more like "go for it", "do whatever you have to do, whatever is going to cut me costs".

I: Makes total sense. So if you had to summarize the main advantages of AI-based solutions, what would that be?

Automation makes all the operations more cost effective. You don't have manual, tedious work. When you are letting the system do the work of a human is cost efficient. Two, in many cases it performs better. It removes the possibility of the human error and as long as you are feeding the system with the right data there is always going to be an increase in ROI.

I: You mentioned a couple of time the word automation, can you elaborate in your own words what the automation is all about?

R: To put it into a practical example, what we previously did was you could select a particular price per keyword so you would have manual inputs. What automation does is eliminating all of those tasks so instead of you putting in these values and this numbers, the system takes over. So you can give it a little bit of information to start but that manual process is totally gone. That would be one example in terms of pricing and in terms of ad creatives but similarly another version of automation is in creatives which is a huge part of digital advertising and would have been the main reason why people were hired which is copywriting and that was a huge part in the department and as USPs we are involved in this process so you would manually write the headline and title as well as content. The new system completely eradicates all of that by automating the entire process so when I think about the digital advertising in general , anything that can be written down with clear instructions and it's manual, can be automated. If there is a clear process the computer can do it. And then the opposite to the automation is you can never come up with a very creative idea because you can't write it in 6 steps and say do it and the computer will never be able to generate that and for me that's the only type of person that's safe in digital marketing.

I: I see. Are you able to name the AI subfields that are involved in this automation process?

R: The main one that for example AdWords would use is machine learning. We tell the machine what to do and it picks it up in the algorithm. Some other fields that I see becoming more and more important are sentiment analysis in the natural language processing. To give you an example not only within our company but other businesses in digital advertising, in the customer service role or the chat where people would be answering queries. Manual the customer service rep will be seeing if the customer is happy or not and huge part of AI is sentiment analysis and all those moments were we would be relying on the human determinant, robot can entirely do that instead. It also has its implementation in the digital advertising: website, top up or remarketing are all influenced by the sentiment analysis. There are many others, but to be honest I cannot remember them properly…

I: Don't worry about that, we should only cover the topics you are confident talking about. Would you be able to maybe connect me with the people who know more about these technical aspects?

R: Yea, definitely. There are few people who we work with in terms of data analysis that tried to explain that to me a hundred times haha

I: haha now, talking a little bit more about the entire ecosystem of the digital advertising , who do you think is impacted the most by all these changes?

R: It's a very interesting question. What my initial thought was and everyone around thinks is that consumers are the ones that are impacted because the ads they are seeing and the things that are being communicated are drastically impacted by AI. However, I actually think that the consumers always felt somehow lied to by the advertisers or the advertising companies so there is no big shift in this direction. What I think is that people who are doing the jobs will no longer have any work to do and this is something that every company in the industry should consider. Even when I look at my own role, in a few years time I could be not competing with the data and insights provided by AI-based platforms.

I: That actually brings us to my next question. If we look at the digital advertising in 5 years time, what would be the biggest disruption, how it's going to look like?

R: If I think of digital advertising, we can categorize our customers in 3 groups: we have these really really small advertisers who do everything manually, we have a mid-market segment that is trying out the automation and then we have programmatic advertising which is fully automated and totally algorithm-based. And in my opinion in 5 years it's going to be just the programmatic and just the small customers and nothing in the middle. Anyone who is in the middle with the mix of automation and manual, will be obliterated or they are gonna progress into the programmatic stage or they fall back into the tiny customer work. I also think there will be a huge shift to the offline media and people that are going to be valued the most, will be people that are able to think outside of the box. It's because programmatic advertising got to the stage where people are saturated so if you think about it, if we automate ads and we automate the keywords and we automate even people's website, where is the differentiator, how are you any different from your competitors if we basically build everything for you. There is nothing that makes you stand out so the only way to differentiate yourself is offline media or pop-up stores or creating some sort of branding. So I think it's going to get to the point when we have to switch back. And I know it sounds kind of intuitive but the digital will completely lose its power. There is also a big raise of video. So far digital advertising was heavily focused on text but this kind of idea of influencers or instagram and facebook, snapchat with messages that are in short window of time.

I: Let's go back very quickly to how it's going to impact the people working in the industry. Which kind of skills will be needed in order to be able to work in digital advertising?

R:There's two spectrums. There is on one side, we will have creative people who will think about how to communicate the message, what language is important and what visuals and

what artistics. And then on the other side you have people who are experts in programmatic, who could code, who can come up with algorithms and build these learning models. A piece of advice I tend to give to junior people working in digital is to develop the ability to translate the insights from data, so to put that in an example, anyone who is already using the automation already and is able to derive insights. So the computer could tell us that the sales are going down but it might not know that it's because it's raining; or the sales of a particular pair of shorts are going up and it's only because Kate's Middleton son was wearing them. The second thing is communication skills and the leadership presence that a lot of people in digital lack.

I: You mentioned the word "fear" before when talking about the customers. Building up on that, do you think there is anything we should be worried about when it comes to AI-based solutions?

R: There are two main reasons for the fear to arise. One, people don't know what the machines would do and the machine could always break. Let's also not forget that if you feed the machine with incorrect data, things are going to break. So before moving toward AI you really need to make sure you have a good understating of your business and the data you need. Second thing is that we are in a really difficult balance at the moment with AI, between convenience and intrusion. So as long as we sit in the middle of that pelgium it's ok. And what I mean by that is that I don't mind to be shown an ad for something that I kind of looked up because actually I really needed that even if that's a little bit creepy, I still really wanna buy that and you've got your targeting on spot. But let me give you this example: I went to the bank this weekend because I lost my bank card and they were like "oh it says in the system here that you are interested in the mortgage" and I said " how did you know that" and they said " you clicked on the mortgage ad and you used our online calculator" and my first thought was "gosh, that's so intrusive" but actually I am interested in mortgage so it' still on the balance of convenience without being too intrusive. But there also many examples in which the AI is not used properly: there was an article in the newspaper about people who were killed by the carbon dioxide poisoning and a gas company had an ad saying "switch to us for more savings" and it was so inappropriate and so damaging for the brand. We have to be very careful because that's irreparable.

I: That brings us to the topic of regulations, which is a huge one so we are not going to discuss it into details but what's your stand on this?

My main concern is that the law cannot keep up with the technology and it never be able to do that so that's actually very frightening to me because the governing bodies don't know exactly what they are doing. I think we definitely need to be revisiting our data and protecting laws but the people who are in charge of the laws need to first understand the product. Right now the laws are coming in after the fact, after there has been a major policy violation, see Facebook for example. It only takes one mistake to take the entire system down.

Respondent's reference: R02
Role: Marketing Manager
Sector: Large retail company
Interview format: In-person

I: Before we jump into the actual questions regarding the A, I would like you to tell me a little bit more about your role.

R: I'm a Marketing Manager for one of the biggest retailers in apparel for the whole CEE. My main goal is to drive sales up and the cost per acquisition down while implementing the newest technologies available in the market. In fact, we proud ourselves to be one of the most innovative companies in this vertical.

I: Are you responsible for both online and offline marketing?

R: Main focus is online, prevalently due to this "innovation" part. We believe that we can have way more impact online than with traditional media thanks to the personalization. We are trying to have product part and marketing part go well together. We of course we still make use of the traditional media but that's mainly because of reach, as we cannot reach that many people online unfortunately.

I: Not yet!

R: Not yet! [laughs]

I: For how long have you been working in marketing?

R: I have been dealing with marketing for almost 10 years and it's been 3 years in my current role.

I: In these 10 years you must have witnessed the transformation of the industry. What happened?

R: What we have seen in the past years during my professional career, including my current company is that the customers have changed a lot. We need to find new ways of listening to our customers. How things were done in the past is: we created a product, we marketed it and people bought it while nowadays we try to answer people's needs. This is the most profound shift in the industry as a whole. Hence, the role of marketing has changed as well. It's not only about displaying the product but also about telling the story about how it was made and how it would fit their daily routine. We try to build a relationship with the community of our clients.

I: And which technologies helped you to take advantage of this shift?

R: We truly believe that personalization is the key of success and in order to be able to do that in digital world we had to rely on automated solutions. Of course, not every API is great but we always try to find the best solutions. The computing power that we have at our disposal now is greatly exceeding what we had just a few years ago.

I: Taking a closer look at your company, how did all those changes affect your organisation internally?

R: We fired people and he hired people [sights]. New departments were created in terms of technology. Previously, we had an IT department which was basically fixing our computers and that was basically it. Now we have in-design IT department, we have a special mobile related team, we have app specialists and e-commerce team. We also have data analysis team that gives us insights and tells us how to apply them to marketing. A lot of these roles became intertwining and the division is blurred.

I: And if you had to point out a skill set that those people need in order to do their job, what would that be?

R: So previously we thought about marketing in terms of creativity and cost efficiency and that influenced ou hiring process. Now, the first thing we look at in our potential hires is analytical mindset but we keep encouraging the creative side. The best of both worlds.

I: Going back to digital advertising in the strict understanding of this word. You mentioned a lot of innovation is going on - how did it affect your internal processes connected with digital advertising?

R: Our relationship with agencies was definitely affected and especially with creative agencies. We do have a performance team in house but we also outsource a lot of activities such as for example all the creatives. And we always require from the agencies to pick up all those trends from the market and implement the most effective solutions. Also the means we are using in the company have changed In the past we were based on very performance driven metrics purely looking for the lowest CPA the lowest cost per acquisition, lowest cost for sale and now we are looking into the lifetime value of the customer we are not focusing

on single transaction. We are trying to build a model in which we are able to having you as our customer within our company and then we can basically add value to you as the customer

I: And how does the AI help help you achieve those goals?

R: It makes our life easier in terms of data analysis we're also able to build models in a very fast and efficient way especially because we have easily accessible inputs to this model and frankly speaking we cannot do that manually anymore. Another great thing about it is that the model tries to learn from itself interest of develop.. look I'm not an IT guy so I won't dive into details but I'm happy to connect you with some bye to people in our company. In few words what's happening once we've created the model they're tweaking it with the help of the AI and machine learning for it to give us the recommendations about which brackets of customers we should be more on as well as the ones that are not profitable.

I: if you had to summarise the main advantages of the AI base platform what would you say

R: cost [laughs] what we've seen is that we are we're definitely cut more cost efficient by saving time and investing only in media that drive our sales.

I: Any dark sides?

R: We had to fire people. Apart from that I cannot see any.

I: What happened with all those people if I may ask?

R: it's happening because some of the roles we had are obsolete now and with the use of technology we could make a better use of our internal resources.

I: On a conclusive note, how do you see the future of digital advertising 5 years from now?

R: I think it's going to be automated. We will only set the goals for the campaign, provide creatives and the system will do the rest. It will be based on all the data collected throughout the years and it will be able to react to all the market signals in a second whereas our team would have employed hours to do the same type of work.

I: What would be the differentiator then?

R: In the short term, the companies that will adapt first are going to win and the rest? Well, that's another story…

Respondent's reference: R03
Role: Account Manager
Sector: Traditional Media Agency
Interview format: In-person

I: At the first question and would you mind telling me a bit more about your role?

R: I work in traditional Media agency it's a big Media Group that it's working all over the globe we work with international clients we are mainly focusing on buying Media working with traditional press TV and radio as well. so a bit of offline and a bit of online.

I: How did the online find its space in this traditional part?

R: Well, video is more and more important so we are trying to combine traditional media with digital because this is where the new users are. So the youngest audience especially. But I still would say the biggest share of what we do budget wise it still traditional media.

I: If you had to give me a couple of numbers approximately?

R: Depending on the client but it will be probably around 60-70% of budget going to traditional media and the rest to digital.

I: And if we look at the digital part in the past few years are there any trends that you can spot or any disruptions that affected the industry?

R: the few trends I could think of are definitely much more video ads, more focus on applications and mobile and then a lot of data driven solutions. What is changing, so in the past we would have a lot of people working with us on optimising campaigns and adapting bids keywords and so on and right now we are more focusing on people who are managing a

lot of campaigns at the same time. Talking about taking advantage of the automation in the development of our company, we have developed tailor-made attribution model. It is different from what it's currently on the market and it allows us to focus on analysing signals from other media and then adapting the model to our clients' needs.

I: when we talk about automation is it something that is happening within your own company, or is it an external push so you had to implement it in order to stay competitive?

R: I'd say that our company it's really competitive and we are the pioneers when it comes to adapting innovative solutions. We have the goal of being fully programmatic for example until the end of 2019.

I: Could you explain what programmatic is for me?

R: Programmatic is automation per excellence, so it's mass media buying and because of that we have much more that specialise in programmatic rather than on each media separately. I'd say again that the skill set is also changing. We need way more analytical people than before. They need to know much more about trafficking or different types of auctions you can have and from which media it's convenient to buy rather than only sitting in this kind of hygiene maintenance at the campaign level.

I: and then looking closer at the relationship with your final client, are you the one implementing all those changes for them or do you actually need the approval and sometimes convince them to go on the automation side?

R: for programmatic we need to convince them because it's expensive. So first you have some fee to even get double click, then there is a lot of time investment needed to learn how the platform works as it's completely different from other media solutions we are using. But if we have big clients and we proud ourselves to work with the biggest brands in our country, it often comes from other countries, coming from the west especially. So if they're doing this in another country they're all so much more ready to do it in the local market as well.

I: So it's kind of a trends and they don't want to stay behind?

R: Yes, exactly.

I: How about all those customers that did not decide to go into automation or programmatic? What's the biggest objection from their side?

R: I would say they are mainly smaller clients who really believe that they have better knowledge than some automatic tool about the industry. They also want to control everything so the main objection is normally control and better knowledge than some machine can have.

I: And why do you think it's so what is driving this kind of behaviour?

R: Well, sometimes those are the people that have been in the business like years so they are simply used to work in this way do you really think they know much better. They just have experience in that and I believe that the experience is extremely valuable. There can be some part of them being afraid of losing jobs I think.

I: Talking of which, how do you feel the job market was influenced?

R: I think most of the decisions are taken on the C-level, therefore people actually working on the campaign have little or no say in all this processes. Some of the companies decide to do some extra training to keep the resources and educate them as much more technical skills are required. Also a good understanding of the whole digital landscape including how the whole programmatic media buying is working. I have a feeling that when you work with adWords, you think more about seasonality, which kind of keywords should be used and in programmatic you don't really think about that, it's more mass buying so quantity rather than quality in some ways.

I: When you work with clients that actually opted in this kind of solution, what do you think is the biggest benefit from their perspective?

R: The budget is much easier to share, they can buy more media at the same time, they can go full in instead of deciding where to go and planning too much, so it's way faster.

I: And looking at the future of the industry, what do you see?

R: I think that entry level SEM people will not really have existence anymore. And definitely everything is going towards programmatic, so it's not only my company, my agency but also a lot of our clients that declare that they want to become fully programmatic eventually, so there will be less people working in this field and there will be only some kind of few specialist, very technical who will be just supervising how the whole campaign is going and rather reacting.

Respondent's reference: R04
Role: Business Development Manager
Sector: Tech company
Interview format: In-person

I: Can you tell me a little bit more about your role?

R: Sure! So I work with some big advertisers mainly focused on traditional media. I try to encourage them to go into the digital transformation in terms of advertising and also to use technology as enable in order to expand their businesses in both digital landscape but also in terms of creating a main core connection with the customers through the digital touch points.

I: For how long have you been working in this industry?

R: So I have been working in the advertising industry for eight years and one year in the current company. First, I have been working more on the traditional media side then with the evolving media landscape I switched to the online media but also having the feeling that the traditional media are still an important component of the media strategy.

I: So going back to the job change that you just mentioned, what was the main reason the main driver that pushed you to take that decision? Leaving beside all the personal reasons.

R: So in my former company I've been expanding my knowledge in my expertise but my learning curve started to flutter. So I decided that I would either go to the client side or to the technology provider site. I decided for the second as I saw that they have much more than divers environment also terms of gathering experience, working with various number of clients not only focusing on one vertical or one brand.

I: You mentioned that you were in touch with the digital advertising board for 8 years now. According to your observations, what are the biggest disruptions and innovations that happened over the past few years.

R: I would say that first of all, around 10 years ago we had the introduction of the mobile as technological bridge between offline and online worlds. Anything is drives the most significant change in terms of gathering data both about the consumers but also equipping the consumers with more information about their needs and brands they're looking for. So with this massive data inventory that came into the marketing game, I think it's critical to be able to understand it's complexity it's rapid appearance in a massive scale and in terms of interpretation of the data I think the key component is to involve the advanced technology such as artificial intelligence to help the advertisers, brands but also media agencies and also technological providers to understand the insights coming from the data itself.

I: Would you be able to name specific branches of artificial intelligence that has been introduced? And then which kind of final products were they translated?

R: In the company I'm working right now, that ability to gather understand and use the advanced algorithms to process the data in the large scale and basically in the real time. It allows us and the brands to directly transfer the massive amount of data into the final products for example targeting solutions that can be easily applicable to marketing strategies. the massive scale of gathering the data and using the machine learning to analyse this data

and as the outcome give the advertisers the very specific consumer segment that might be used in a digital strategy as one example of how these two components coexist.

I: We touched upon this topic already but let's discuss the biggest advantages you can see in AI based platforms and solutions?

R: Well, if you can see there also gathering the data in building the advanced CRM system on the client side you could also get the incredible precious insights: who your customers are, which groups of customers are the most important in terms of revenue in terms of the loyalty and you could then diversified a communication or the whole marketing tactics based on those segments. so if you have an advanced CRM system on your side, analysing the data not only for marketing channels but also from the sales channels, in general all the channels that you used to communicate with the clients. That would allow you to have a full holistic picture of the entire consumer journey.

I: In your opinion, what are the trends that will have a huge impact on the industry in the future?

R: Internet of things. Not only from the marketing perspective, but also regarding meaningful interactions between human beings and technology. So we see the rise of the smart devices coming up, and the more those devices will collect data from people's lives, their needs, their queries, the better will be our understanding about our customers.

I: And how can do marketers take advantage of this progress?

R: I think that if you consider the way you could basically pursue your narrative in a very direct, conversational way that opens a whole new world of the narratives you could use with your customers. At the same time thanks so machine learning will be able to have this kind of direct and personalised communication as a large scale.

I: and there's also a lot of talk about programmatic what's your stand on that?

R: it's not a trend, it's something that it's already well-developed and I think that if you consider programmatic as it's core definition so applying the technology to data making actionable outputs, I think this is the true beauty of the data. When you decide a set of rules that triggers a set of actions, it allows you to focus on business in a more strategic way rather than pull all the levers manually and do the time consuming data mining because you already have a technology to do that for you so we can focus on driving the car rather than changing the gears.

I: You just mentioned that there is less manual work involved so my next question is how did the job market evolve?

R: I think that people that only working in digital marketing but generally working in marketing should be more of a strategic brand advisors rather than just the people that buy media or set up campaigns. Using this very precise knowledge it should be transferred into a deeper conversation with the client how this could be applied and how this could open the possibilities in terms of their brand development. So when you're setting up the campaign, you should have the possibility to engage with the client in the conversation that would lead to the new approaches and new technologies something that they have on the palm of their hand. They can scale it and take the brand to a new level because they can could focus more on the strategic approach rather than in this very manual adjustments.

I: I'm wondering which will become the most essential skills to have in this role?

R: First data mining but data mining in a sense of selecting sources that are relevant to the project or task. Data hygiene so the ability to disregard data that is actually not important for a given task. And ability to talk about this data in a very insightful way. To summarize, combining the data mining, the data hygiene and the day that storytelling will become essential to translate data into insightful action points.

I: Let's have a quick look at the organisational processes now. how did the companies adopt internally in terms of appropriately using their human resources?

R: It really depends on the organisation. I work with several organizations that manage this process pretty well because they expose people previously involved with the campaign setup to way more strategic conversations with the clients. This is extremely useful for both the client and for the people in that specific role as it can expand a skill set and get a broader view of the impact they are having on client businesses. So I think that's because it allows people to expand their knowledge and shows them they are part of a bigger picture. And there's more than that, they can actually shape that picture through the insightful conversation with the end client.

I: So far we mainly talked about the benefits but for every benefit there must be a dark side so in your opinion what is the dark side of the AI-based solutions.

R: Well we definitely need to be careful regarding the data privacy and all the connected policies. It's a very sensitive topic as we need to make sure not to close the doors to the advertisers but at the same time to the comfort of the user to have a full control about their data: where is it stored, by whom, for how long.

I: One last question: We all know that most of the automated solutions are coming from the big tech companies to then be passed on to the lower layers. How do you perceive that process?

R: I think the role of all those big companies is that only to develop those solutions but also to create an environment where all the different businesses including even the smallest players can make the use of this joined knowledge. I believe that the entire process is working quite well as all the different stakeholders are equally involved.

Respondent's reference: R05
Role: Account Strategist
Sector: Digital Agency
Interview format: In-person

I: Could you tell me about your role first?

R: My job title is Account Strategist and I have daily contact with the customers that my agency serves with relation to their digital marketing campaigns. Depending on the customer's priority and the size we would have weekly bi-weekly or monthly call where we check the status, give updates on the current performance and come up with suggestions and improvements and extensions. Ad hoc, crisis management as well.

I: What would an example of crisis management be?

R: Usually it means that something went wrong with their digital campaign or digital presence so for example dropping sales or some negative feedback that would appear on digital sales channels that could in future damage the sales projections. Those kinds of things. Or sometimes the customer sees something in the media and they really want to implement it so that also counts as crisis management.

I: When you say there is something wrong with the campaign, what usually goes wrong?

R: So usually it's either the customer's website. So the website is down and the customer would usually go to us first instead of checking their own servers. The second one is problem of creatives so the system could take creatives down due to malicious software. Sometimes the error lies on our side as well: we set the bid too high or too low. Not anymore really, but that used to happen in the past.

I: Building up on what you just said, could you walk me through your daily routine from the moment you started at this company, how many years ago?

R: 3 and a half.

I: Yes so what changed in your job in the past 3 years and a half?

R: So basically what changed are the upgrades made to the tools I use in my daily job, mostly the account management. At the beginning, we would really go into detail about bid per keyword, effectiveness per keyword, per creative, per campaign sometimes you would have to spend 1-2 hours on every account checking the performance and changing bids "so there's not enough clicks maybe we should up or down the bid". Because everything was done manually it was difficult to find the root of the problem. If something went wrong we would have to check all the change history and it was very time consuming and obviously my productivity was so much lower. And I would say with confidence that between me and my colleagues the error margin was much higher. So right now we are doing more of a scale up overview. So for example once that we know that the return on ad spend is working properly we just need to overview the entire process and react in case they are shifts in our client's strategy. This gives us a lot of time for experimenting with new campaigns and new solutions. It also allows us to give more insights to our customers. So for example we still do the keyword effectiveness analysis but instead of deciding which keyword is more effective which will be done by the system but we give our customers all the insights. This kind of support was not possible beforehand due to the lack of time. So in few words it's less maintenance and more development.

I: Did you feel that you needed to develop any new skills in order to be able to keep up with all those changes?

R: Well, mostly product knowledge because it's kind of a new feature of the system we use. The product is not easy to understand so in order to be able to explain it to my customers I needed to have all the information to myself first. There was also a bit of communication challenge when talking about these matters because our customers do not only have digital marketing they have TV, newspapers, radio everything so in order to be able to convey your message you have to be able to simplify it. And also because we do less groundwork and more analytical work that was more kind of work in progress: the more analysis we did, the more we learned about it.

I: I see, I see. And since you're in touch with both sides: all the big tech companies that are setting up the tone for the industry and small advertisers, where do you feel the entire industry is going?

R: I'd say it's further automatisation. The bids setting and targeting are mostly done automatically, the creations are still mostly by manual input. Even if there are already some first signs of this being automated. at the moment we also have access to different platforms such as search display video and so on. Anything that at some point we might get to the point when the advertiser will only give us the budget the message he wants to convey and ok are and this it system will choose which platform to use. Therefore my role will be overview and analysis analysis analysis.

I: You mentioned a very interesting thing about how you see the future, about the client deciding the budget and the system deciding all the rest. Isn't it something that is already being implemented through the programmatic buying?

R: The obstacle with the programmatic buying is the amount of data that is required. There must be enough data from the past advertising activities plus programmatic is very expensive. To be completely honest I work very little with programmatic because it's just too expensive. The long-term I think it's all about proving its effectiveness to the masses and going down with the price benchmark. I really think it should be something like electricity they don't have to come with the €1,000 buy in order to use this solution. By doing this it will be also available to small and medium businesses that probably need them the most.

I: Which is actually my next question: they're basically a kind of the middleman between big tech companies and small advertisers if I understood correctly. When there is a new automated solution rolled out how does the entire process and communication look like?

R: Well, there are two groups of customers and it really depends on the company. There are companies that are super savvy and their owners are marketing contacts who who privately read about those things and approach us asking for more details. The second group is made by conservatives people that need to be convinced. For my job it's 80% Conservatives and 20% savvy customers. It's part of my word on my job to inform them on this novelties, we tried not to overwhelm them to pick up only the solutions that are applicable to them. Normally we are the ones doing the introduction, I am doing the pitching in most cases. It's always a challenge because a lot of customers have kind of a scared approach to those things.

I: What do you think is the main reason for them being scared or worried?

R: I think they don't trust what they don't know I think it's something in the human nature and that was forces us to do it step by step setting the industry standard very smartly by by offering automatic bidding, solution by solution. So if I went to a fully manualized client and told him "listen there is a programmatic solution just give me money and it will take care of the rest" they will never agree. I can show them the results of those small automated steps. I think it's about breaking the next stages of resistance. Very often a success story from the market could help. There are also some influences and if they vote for this solution there are bigger chances that the customer will agree to those. Also, if someone from the industry did that they fill prompt you simply don't want to stay behind the competition.

I: Do you feel there is any correlation between the size of the company or the actual spend in digital advertising with the willingness to invest in automated solutions?

R: No not really. I really think it depends on the company and on the growth strategy. Very often decision makers within big organisations are happy with the status quo.

Respondent's reference: R06
Role: Programmatic Account Manager
Sector: Programmatic Company
Interview format: In-person

I: So before we start with the actual interview could you please tell me a bit more about your current role?

R: I'm an account manager for Doubleclick search. I work as a consultant for a double click clients. So when a client decides to sign a contract with double click, he receives a full service by an account manager. Mostly the role of the AM is to try to optimise their campaigns and obtain all the benefits from doubleclick search and use and activate all the features across all their different activities.

I: Hmm. Can you tell me what Double Click is?

R: Double Click is part of Google products and it bring technology into media buying. There are different products for DC, in particular DC Bid Manager focuses on the Display side media buying. And the DC Search focuses on the search part. Most of the activities of DC search are scaled and account optimizations using technology and artificial intelligence.

I: Can you tell me about how the AI is incorporated?

R: one of the most important features that we have in DC for search is automated bidding. Whenever you have a campaign that is into DC search there is a possibility to activate bid strategy with the automation of bidding at keyword level to reach a given objective. There might be different kind of objectives for a client, for example position of a given keyword, or maximizing the number of clicks or performance oriented objectives such as maintaining a certain level of CPA or increase the number of conversions. Given that, the client has the possibility to set the objective for a series of campaigns, the algorithm will take care of everything else so giving the perfect bid for all the set of keywords to maximize the results.

I: If I'm a new client, starting with programmatic which kind of information do you require from my side and what can be automated?

R: In particular, for the search area an important aspect to consider is the structure of the account - this is something that is still done manually. So manual creation of campaigns, ad groups and keywords. So the structure is given by the agency or … Given the structure, an important information that we always ask our clients for is: what is the objective? So what are you trying to achieve and and what are the business goals that you are trying to achieve for that given account. For example, if i'm an e-commerce player I want to position myself for the brand keywords so I want to be always there when the client is searching for my keyboard but at the same time I have a series of generic keywords for example where my objective is to try to deliver the best result possible to maximise the revenue or to decrease the CPA and similar. That is an important aspect to consider and that naturally need some important information that is still needed from client. All the rest is left to automation. So bidding, also reporting can be highly automated. Activities can be scaled a lot in the interface through the rules and labelling. Through the interface you can have a single interface where you managed various accounts inside the double click search. This gives the possibility to the client to focus even more on the strategic part and come up again with the beginning point this business call this is how we would like to optimize towards the business goal.

I: If we had to point out a couple of main differences between programmatic and AdWords for example?

R: Automation. Automation and the usage of data to automate the delivery of results and to increase the possibility to reach that given goals or results. Automation is the biggest part using artificial intelligence we have this possibility to help clients achieve results. Naturally an important part, an important aspect that comes at the beginning is data. Starting from the data the algorithm is able to apply artificial intelligence and in that way help the client reach a given objective.

I: You keep mentioning a series of great benefits, then my question is why aren't all the clients switching to programmatic? What is the biggest barrier at the moment?

R: Mostly, these kind of automation works perfectly with performance-oriented clients. So the client has to be literally performance driven and with goals connected to increasing in the number of sales to the website or delivering a better CPA. for these performance direct response clients this is the perfect solution. In other cases we still have a lot of features that can use branding bid strategies or reporting but it doesn't bring the same level of advantage. So doesn't make the benefit for the cost of the end.

I: Is there any financial barrier as well? Is there any minimum budget requirement?

R: No, whatever client can access the tool.

I: And for the clients that are currently using DC, what's in your opinion, the biggest advantage?

R: Automation and scalability. The possibility to automate activities and to scale them across different accounts in a single interface.

I: Looking further, how do you think the programmatic will develop in the years to follow?

R: As long as there will be more and more technologically savvy customers, that will become one commodity. So most of the clients that are looking to deliver performance will try to get the best using that and using automation. At that point to get the competitive parity all the other clients will have to enter into programmatic. All this, as long as the technology advances, the usage of the platform advances.

I: And looking at your role and the people in your team, which type of skills do people need in order to be able to work in programmatic?

R: So it's all about helping the clients to obtain the best results, it's really important to understand the strategic aspect, what they need, what are they goals. So I think there will be

more and more focus on under strategic understanding of the client. Some more movement towards account manager as a practitioner and at that point technical knowledge of the platform and applying all the features to the client.

I: Do you only work with direct clients or also agencies?

R: Both.

I: Do you feel there is any difference when dealing with those two groups of stakeholders in terms of how they approach programmatic in general, how eager they are to implement this kind of solutions?

R: Not that much actually.

I: Are there any obstacles when you pitch specific solutions, suggest to automate certain parts?

R: In some cases what we have to do is to describe the benefits that they're going to get with that feature. What happens, sometimes users are reluctant to pass from manual that gives them control over different aspects of a campaign do automation of that same campaign so giving full control to the machine. so if everything is created correctly the system does the bidding four times a day based on historical data and the campaign performance and this is something that would not be possible manually. so in most of the cases if everything is set up correctly automation delivers better results.

I: you mentioned before "if everything is done correctly", are there any situations in which the system crashes?

R: it's a machine so naturally it's still needs an account manager who make sure that all the settings are done correctly. So I'm translating business objectives into a setup within the system.

I: One last question. Who is the one who takes the ownership of putting the right data into the system?

R: So I would say that at the beginning it's account manager taking care of the set-up in the correct settings but later on it's about best practices and educating the client to do all the things on their own so they become completely independent.

I: So going back to the shin area where most of the clients will switch to the programmatic where all the bidding creatives and so on will be done automatically, what will be the differentiator?

R: we all use the same machine we all do the same thing for optimising but there's still a whole world that is left to an advertiser: a website and it's user experience, visibility. so this is something that is disconnected from media buying. We can try hard to redirect the client to website but the rest is in your own hands.

Respondent's reference: R07
Role: Account Manager
Sector: Creative Agency
Interview format: In-person

I: Could you tell me a bit role about your current role?

R: Sure, so I work as account manager in a chain creative agency and my core role is to cooperate with biggest agency accounts. I represent agency on client meetings but I also represent the client on internal meetings within the agency and my most important responsibility is to keep track of the whole execution process of the creatives for the client.

I: Besides your final client and the internal stakeholders, who else do you interact with?

R: Taking out the creative teams and strategy teams, I also work with media agencies, with performance agencies and with BTL agencies.

I: What kind of collaboration do you have with all those agencies?

R: We try to be partners here so most of the time the biggest clients will need both creative agency and media agency as well. So to simply it, the media agency is in charge of buying the time on TV and radio, space in press and so on and creative agency is in charge of creating the ads for those media spots.

I: is there any automatization in the creative space?

R: There were a couple of attempts, mainly there are not handled by the creative agencies themselves but by media agencies. Because many media agencies try to automate the creative process especially in terms of display creatives. So that's the piece of pie they try to take away from creative agency and some of them are really successful with that.

I: Can you elaborate a bit more on how you are affected by all those changes?

R: Yea, so the most important question here that every marketing team needs to answer is whether they want to have high quality creatives that will be in line with their brand or if they want to be super performance-oriented. Because if they are performance-oriented they can try to automate the whole creative process and try several creatives to see which one will be the most effective.nIt's a path taken by many companies that are not the high end so for example Prada wouldn't probably do that or Mastercard wouldn't do that because their brand legacy and their brand look is so important to them. But if you are retailer with just regular common goods then it might be the right solution for you.

I: So if you had to compare the benefits of collaborating with the creative agency and automating the creatives, what would the distinction be like? You mentioned already a couple but let's summarize them.

R:Well it's it's really something different, basically if you want to have really well made creative you use creative agency were you have a whole team working on that. So you would have strategies making sure that the creative is in line with the brand strategy, you have creative team in charge of coming up with the entire concept and then the execution and you have a couple of other people such as producers accounts that will make this ad happen. And if you're really performance-oriented it's really a great idea too to try out machine learning in the creative process and see if it's good for you but it's still something very new and not for everyone so I wouldn't take just one of those I would probably encourage my client to do both unless their brand was really high end or luxury as discussed.

I: This brings us to my next question, when we look at the industry in the years to come what will be the biggest disruption?

R: In the long term, I'm pretty sure that will still have the creative agencies and there will still be people working in there but there will be less and less of that. I think that automation will take over a lot and a creative agency will be something luxurious only for biggest biggest companies and brand campaigns wild performance will be all handled by media agencies. We can even see now how algorithms are able to to create new paintings if they can create paintings they can easily create new ads, just give him some time to learn that. In the creative process it's really difficult to teach someone to be creative so people will still need be needed there but less creative projects could be handled by a machine learning in a couple of years from now.

I: You mentioned also that there won't be that many people needed in the creative agencies, is it something that you experience already in your organisation?

R: For now the biggest change I can see is that the responsibility and the scope of work regarding the creating and producing the online banners is shifting from creative agencies to media houses because they can do it for a cheaper price. They can provide just as good creatives in terms of performance as creative agencies and even if they're not as good looking performance is performance for some clients so that's the biggest shift that I can see now.

Respondent's reference: R08

Role: Business Owner
Sector: Privately-owned small company
Interview format: In-person

I: Could you tell me a bit more about your first steps in digital marketing?
R: Of course. So hopefully now we are very big in conferences and trade shows and we noticed that that was not enough and that we had to jump on the train of digital marketing because this was where our consumers were. So first of all we had to improve our website make it more convenient any more accessible for our customers we have also increased are loading speed and implemented and online shop. This idea was also supported by our customers as we met during conferences because in many cases they were not able to buy on spot and we needed to redirect them somewhere. After some research we then realised that to platforms we should start with where Facebook and AdWords and that's where we started our first company that I'm running until now.
I: What kind of input was required from you when you kicked off your first campaign?
R: So since we have the online store we had to create banners, description of the products so the graphics were big thing back then. Additionally for AdWords we also had to create a text ads and readapt the banners to the right format. I was also asked to set the bids but I had no idea how high should it be so it took some time until we've got to reasonable bids. Overall, it took us quite some time effort and money to do that. And I had to do it on my own without experience so it's really took me quite some time. I had to rely on online materialis and some tutorials and teach myself how to do stuff.
I: Let me go back very quickly to your role. Do you only do marketing in house or do you also rely on an external agency?
R: We are doing it all by ourselves so at the beginning I was doing it myself now we have second person the head of marketing so have someone who is more dedicated to AdWords and all other tools were using. I'm just overseeing it's right now. At this point we already build up some knowledge so I don't think we're going to rely on an external agency plus we are satisfied the results so far.
I: Comparing your first interactions with AdWords and the solutions that are currently being offered by all the tech companies you collaborate with, did you see any progress in terms of automation, processes that are being simplified and automated so you don't have to invest so much time?
R: So we started with our digital marketing initiatives a while ago I say maybe 8-9 years. And it seems quite easy to create some banners, text and so. After a few years they kept adding more and more features so I got more complicated. What we are seeing right now is that there are a lot of options that are hard to grasp which is why we rely on automated solutions. So on one hand it's helping a lot because it's less time consuming on the other hand, it's totally different from the way we learnt it so we are giving away a little bit of control over it but we seen that this is kind of situation when it comes the functionalities. This is also why we decided not to collaborate with an agency.
I: You mentioned giving up the control. How did you overcome that fear and decided to actually opt-in for the automated Solutions?
R: So as I said there were a lot of more and more functionalities in the system so we started increasing the number for campaigns and doing everything manually became really difficult and I was the moment when I was spending the majority of my day doing just advertising. And that was the turning point when I decided to give it a try in order to spare some time and catch up on other tasks. I mean I'm running this business with my business partner. we don't have many employees that's why I couldn't do it full time and I also don't want to give up the control and pass it on to the agency. The first trials of automated solutions we're hard

because it takes some time until the system learns on how it should perform anytime is good better. And it was a bit frustrating that they could not influence the creatives, the bids and the buttons and sometimes I didn't even have to specify where to target my ads. But I'm really happy with because it gave me a lot of time to focus on my business.

I: Can we say that overall you're satisfied with the results?

R: yeah of course it can always be better and I would like to see more conversions but comparing it to the past, automation gave me a lot of free time and it works well so yes I'm happy.

I: Have you ever heard of programmatic advertising?

R: Yes I've heard about it and I read some articles in this regards, but we don't use it yet.

I: Would you consider using it in the future?

R: Well yes it's sounds complicated though and again something new to learn but if the advantages would outweigh the cost, sure.

I: In your opinion what could the big tech companies that are somehow setting the tone for the entire industry do better in order to help you achieve your marketing goals?

R: As you know I'm not a very big business and I don't own brands so that's why I really expect sales from why digital marketing activities. That's why I'm very performance focused and I would expect that the futura solutions from the companies will help me to make me measure my performance more accurately, collect some additional data and better find our consumers quicker and more efficiently. So in a few words, solutions that could help me measure things better help me targeted them to the right people. And I would also want to see more performance from video ads there are currently associated with branding.

Respondent's reference: R09
Role: Senior Associate
Sector: Technology Advantage Practice - Consulting
Interview format: Written

I: Good morning, before we jump into the interview questions, would you mind telling me a bit more about your current role?

R: Hey, good morning! I currently work as a Senior Associate at the Boston Consulting Group's Technology Advantage (TA) Practice in London. The TA practice is a specialized group of BCG consultants that helps clients with key questions of digital strategy, from everything to AI and Big Data shaping new business landscapes, to transforming traditional functions like marketing, sales and supply chain by incorporating digital concepts

I: From your experience, what are the biggest trends in digital advertising right now? or changes you see in the industry

R: There are two major trends we see in marketing in general, and of course they apply to advertising as well. The first is the continued shift of marketing focus as well as spending from traditional forms of mass media such as newspapers, TV, billboards etc. to digital forms such as Google Adwords, social media advertising etc. The second is the increasing importance of personalization. With so much data being generated about individual consumption patterns, it is now possible for marketeers to highly customize messaging to the individual. Both these trends are driven by the shift of the modern digital savvy consumer, as they begin to spend more time on Instagram than watching TV, and are getting used to increasing personalization in the products they consume.

This article might be of interest to you: https://www.bcg.com/publications/2017/retail-marketing-sales-profiting-personalization.aspx

I: Would you be able to outline the role of AI in the personalization process you mentioned before?

Sure! Let's look at it based on a traditional marketing framework so you understand how AI fits into each step of the marketing journey.

1. **Gathering consumer data**: Using both already available data on consumption patterns, social media sentiment etc. and generating new relevant data and processing it into actionable insights
2. **Designing a marketing strategy**: Using the consumer insights generated to create a fresh marketing strategy aimed at personalizing the critical stages of the consumer journey
3. **Effective deployment of marketing strategy:** Ensuring that the strategy is implemented in a rigorous, timely and cost-effective manner across all focus geographies and customer bases
4. **Creating an agile marketing team**: Creating cultural shifts and changing the ways in which traditional marketing teams work is not a side effect but a prerequisite to achieving all the above
5. **Meeting consumer needs:** However, probably the most important impact of AI is felt in what is, in my opinion, the key role of any good marketing function - providing feedback to improve the core product offering and meeting consumer needs in more intelligent and cost-effective ways.

I: In your opinion, what are the biggest advantages of the AI-based solutions?
R: Four key advantages, really:

1. **Accuracy**: Because of the large volume of data at hand, there is a richness of accurate information of the consumer based on his or her actual actions. This doesn't depend on any broad segmentation of the market, but rather treats each individual differently, and is as such way more accurate than traditional models that had the pitfall of creating rigid buckets such as consumer segments
2. **Agility**: Because everything is online, the speed at which data can be generated, processed into insight and actioned into a product change is phenomenal. I heard of a beauty giant that was able to tap into the Twitter sentiments of its consumers and make changes to its new product in weeks - a process that would have taken them upwards of 6 months in traditional ways of working, technology and advertising media
3. **Cost efficiency**: Tech giants are working tirelessly to increase the benefit (revenue generated) of advertising while at the same time bringing down cost by using smart automation tools, AI and generally benefiting from network effects as companies from across industries flock to advertise online.
4. **Staying a step ahead:** Another thing to keep in mind is competition. Personalization has increased in all parts of life. It started with Google creating customized ads and Amazon showing very accurate product recommendations. Today, your news feed brings you the most relevant articles, travel companies are creating curated experiences and insurance companies sell just the right policy. Tomorrow, I'll expect Volkswagen to deliver a personalized 3D printed car, and IKEA to deliver cheap, custom-made furniture. No matter what industry you're in, there's something already happening or about to happen on revolutionizing what personalization means. If you don't catch up, the competition will kill you.

I: If we looked at the advertising value chain, who do you think is affected the most by all the trends and changes in the industry?

R: As advertisers realize that advertising on the internet is increasingly cheaper (you get a lot more revenue per $$ spent on advertising), more responsive (customer insights via a facebook campaign can be gathered much faster) and strategically vital (it's where the future of advertising lies), it can be said that the traditional media companies, such as TV and print have the most to lose financially.

In terms of fundamental role in the value chain, another player irreversibly affected is the marketing agency. Tech giants like Google (the advertising platforms of today) are increasingly working directly with companies to discuss ways of improving marketing campaigns, emerging consumer insights etc. The role of the advertising agency is increasingly restricted to creatives (generating content that might appeal to a certain audience as defined by a Google or Facebook) and project management. A lot of the decision making, insight generation etc. is now either automated or done by smart engineers at these tech behemoths.

Respondent's reference: R10
Role: Digital Growth Manager
Sector: Tech company
Interview format: In-person

I: Could you please explain me what your role consists of?

R: I'm a Digital Growth Manager and I am basically helping businesses to use the tools we offer and advise them on which direction they should go in order to achieve their marketing goals.

I: which kind of businesses do you normally work with?

R: It's a high variety of businesses. It starts with small businesses such as plumber or mechanic to quite significantly developed businesses as for example car leasing companies or we can go even to the next level as software companies that are trying to build up their brand internationally.

I: it must be great to interact with such a great variety of clients on daily basis. When you are dealing with a customer that is completely new to the digital world how does a campaign setup look like and which kind of recommendations do you normally give to those clients in terms of optimisation?

R:The first thing that we always start with the keywords. So we put in search engine it's kind of an intention of a potential customer that wants to find a service or product. So basically when I talk with my clients it's all about trying to figure out what kind of customers they have, how do the customers act on their website and how we can find those customers in the digital space. So what does it mean in practice: setting up the campaign, setting up the right keyword, setting up the right audience targeting so in few words you are trying to reach your customers in the digital world.

I: So during my research I've heard a lot the word automation or a machine learning. Which kind of solutions does your company offer in terms of automation?

R: There's actually more than a buzzword. We use it on a daily basis. And the thing with the automation is that you're not supposed to see that. so what you do is that it should help you seamlessly move towards easier practices towards making more time making more efficient your processes and right now what we do in Google is that we use them especially in those

mundane or work intense tas as looking for right keywords, looking for right target group trying to set our ads correct. All those things we would spend hours and hours trying to figure out what exactly we need to do. well automation and machine learning which in the end is processing huge amount of data could help us with.

I: Perfect. As you mentioned before you are working with customers that are at a different stage in terms digital development. What's their approach towards this kind of automated features of solutions?

R: The good thing about Google technology is that it is available to everyone. Mainly what I see when you ask me about different clients is their mindset. So it doesn't necessarily mean that the size of the company determines what kind of approach they have. It's really about how they look at the automation. It could be a small company but the owner is very digitally fluent and he said he's really looking forward to try out new things. It could be a huge company that is so so so pushed back in the old manier in the sense of doing marketing in the traditional way that it is a whole new level of trying to figure out how to convince them to use automation because I strongly believe it can benefit everyone if used smartly.

I: Can you define smartly for me?

R: We basically should focus on two things when we talk about this kind of topics. First of all, we should decide how it can help us use our time better. So right now we have all types of the signals coming from different channels, activities on our cell phones. Basically our users have their cell phones all the time. So if we have all those inputs that we can use we cannot fully process them so we can use our time on focusing on the bigger picture. Human brain has only limited capacity the algorithms we are using do not. So we can just get the output without caring too much of the input and try to make sense out of that. So the second thing the smart use of machine learning could be is to decide where to move strategically. So where we are today we kind of know that seeing the patterns that emerge from your historical data, the algorithm can predict what is the next step. So those two thin things time and strategic moves - I think that's where the automation can play a huge role.

I: And going back to your role, what kind of skill set you think is absolutely necessary in order to be able to perform well in the digital-advertising-related job?

R: I think I will focus on three things here.The first area that is very important when teaching clients about complex solutions is to have a very clear way of explaining. In the end what they do is not giving away the power or control but they are gaining more. I think it's psychological to open up the customer for new things for something they don't know yet. And I think it's a very human thing to fear something you don't know. and it is something we don't know it's a brand new thing it is just happening for them. So challenging them to step out of their comfort zone in terms of the business.

The second thing there's also important is the business understanding. In digital marketing you would assume that everyone is using the same product or similar solutions so everything is the same not necessarily. We can tell which parts of their business can be automated. To be more specific, let's say we have an e-commerce client and someone's looking for shoes. We can definitely use all those search queries we have around those shoes to show them exactly what they want. Whereas if it's a kind that produces shoes for a specific type of clients, a very niche group such as for example orthopaedic shoes there is also a whole different approach to strategy.

And the third one is definitely if your sales sense to show them the value which I think goes in line with communication and business skills so I say combining those two so just like the sales sense understanding of what is the value for the client, what is the return on investment why would it be a good choice for them.

I: And if you had to advice your clients for strategy for the next five years, what would you say? In other words where the digital world is going?

R: That's a tough question, I wish I could know that. But definitely I would say drop the we've always done it this way mindset, it is very dangerous the behaviour of the customers is changing like crazy. Try to understand the customer journey. Hint: automation can help a lot in this process. Start trusting data in analytics.

I: Before we finish, let's talk very quickly about potential disadvantages of machine learning based solutions. What is the feedback you received from your customers?

R: I think one of the biggest fears is again something that we don't know, usually every big change in industrial revolution causes a loss of jobs. What I think is happening for them as shift of jobs in some of the clients might think they're too old, they think they don't have the capacity to change anymore. That's kind of what we see with automation, machine learning it's going to be a constant change rebranding of yourself and rebranding of your skills. that's one thing shift of our drops it will happen that's for sure and we just need to adapt to that. Second thing well I think they're really afraid of is the responsibility and the power they have over their choices which is in the end.