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End of the AI Brand Winter-
Artificial Intelligence in Brand Management

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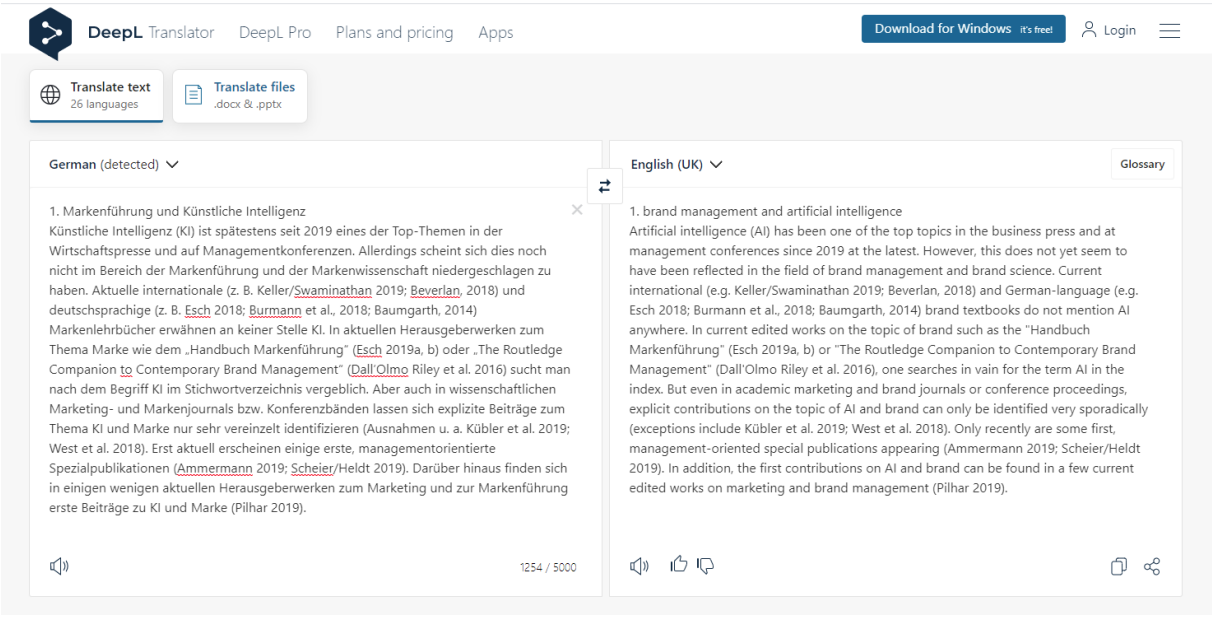
Preface

This article is based on Baumgarth, C.; Kirkby, A.; Lambrecht, A. (2020): End des KI-Marken-Winters - Künstliche Intelligenz in der Markenführung, in: Digitalisierung in der Betriebswirtschaft, ed.: Pernsteiner, H.; Schönong, S.; Gögus, H. S., Vienna, pp. 1- 35.

The article was updated and translated into English using the AI application DeepL (www.deepl.com). DeepL was first published in 2018 by a team from Cologne (Germany) led by Dr Jaroslaw Kutylowski. Meanwhile, DeepL offers translations in 26 languages and a glossary function that allows users to define their own translations. In addition to the free function as a web application and app, the company also offers a paid version (DeepL Pro), which, among other things, allows for more extensive glossaries and the translation of longer texts. In order to test the sophistication of the DeepL translator and to reflect the quality of translation, as few edits and changes as possible were made by a human editor. Words or sentences were only changed if, for example, the word selected by the AI was incorrect, or if a sentence was translated in such a way that the original meaning was lost or would be confusing to the reader. The sentences marked in grey, illustrated as such, shows where a human corrected or adapted the AI translation. Overall, Alexandra Kirkby (native English speaker and co-author of this working paper), corrected around 1.6 % of all words. Many of the "mistakes" are based on proper names (e.g., Joseph Weizenbaum), technical language (e.g., touchpoints, gaze plots) and minor alterations to sentence structure.



Example of a DeepL translation

Image Source: https://www.deepl.com/ (05.08.2021)

Berlin, September 2021 Prof. Dr. Carsten Baumgarth, Alexandra Kirkby, Anja Lambrecht

Content

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1 Brand Management and Artificial Intelligence

Artificial intelligence (AI) has been one of the top topics in the business press and at management conferences since 2019. However, this does not yet seem to have been reflected in the field of brand management and brand science. Current international (e.g. Keller/Swaminathan 2019; Beverland 2021) and German-language (e.g. Esch 2018; Burmann et al. 2018; Baumgarth 2014) brand textbooks do not mention AI anywhere. In current works on the topic of brand such as the "Handbuch Markenführung" (Esch 2019a, b) or "The Routledge Companion to Contemporary Brand Management" (Dall'Olmo Riley et al. 2016), one searches in vain for the term AI in the index. But even in academic marketing and brand journals or conference proceedings, explicit contributions on the topic of AI and brand can only be identified very sporadically (exceptions include Kübler et al. 2019; West et al. 2018). Only recently are some first, management-oriented publications appearing (Ammermann 2019; Scheier/Heldt 2019). In addition, the first contributions on AI and brand can be found in a few current works on marketing and brand management (Pilhar 2019). Also, first overview articles and conceptual contributions on the topic of AI & marketing (e.g. Huang/Rust 2021; Mustak et al. 2021; Verma et al. 2021; Vlacic et al. 2021) and on the topic of consumer behaviour & AI (e.g. Ameen et al. 2021) appear, which also deal with aspects relevant for brand management.

Based on the undisputed high relevance of the topic of AI for brand management as well as the low level of research and knowledge, this article aims to identify fields of brand management that will be changed by AI in a condensed overview. In addition to an outline of the respective field, it is explained by practical examples from the brand sector and other fields and supplemented by existing scientific results. The aim of this article is to put an end to the "AI brand winter".

After this brief introduction, the second chapter lays some conceptual foundations for AI. Based on this, six fields highlighting AI and brand interaction are outlined, divided into analysis and management, which already have a high significance in brand practice today. This is followed by a discussion of important barriers that prevent the use of AI in brand management. This article concludes with a brief summary from a management, research and teaching perspective.

2 Artificial Intelligence: A (final) Attempt at Clarification

The film "The Terminator" is familiar to every science fiction lover. Back in 1984, the start of each of the six lavishly produced cinema productions corresponded to only the imagination of screenwriter James Cameron. However, his vision today is no longer just a distant future scenario, but is rather moving technologically into ever-closer reach. An AI in human form, sent from the future to secure its own existence in the present as a killing machine more powerful than man himself. What makes this so topical is not time travel at all, but the fact that man has created an AI that will eventually turn against

its creator. The "dream of a triumphant, man-made intelligence is not a 20th century Hollywood invention, however, but much older. As early as 1769, Wolfgang von Kempelen created the so-called "chess Turk", a mechanical figure that competed against flesh-and-blood players and won many of the chess games. Even though it turned out afterwards that it was a hoax, since a human being was hidden inside the machine and therefore the intelligence of the "machine" was a human intelligence, the "Schachtürke" and similar apparatuses from that time prove the "old" desire of man to develop intelligent machines.

Typing "artificial intelligence" in a Google search currently yields 5.9 million entries in German (Google 2021a) and 161 million entries in English (Google 2021b), whereas the search for "human intelligence" only yields around 37 thousand (Google 2021c). So people seem to have a greater interest in "man-made" intelligence than in "human" intelligence. This search result shows how important the topic of AI is currently being discussed. But what is behind it, behind AI?

In the course of industrialisation, the drive for technical innovation was to imitate physical, human labour, which was to be replaced by the use of machines or their automation. However, the goal behind AI is to try to reproduce human cognitive perception and processing, which is ultimately part of decision-making (Menzel/Winkler 2018).

Alan Turing documented the first significant findings in connection with AI in 1950, testing the recognisability of a human vs. a machine with subjects within the Turing Test (an imitation game). A jury person was supposed to recognise which of the other two participants was male or female by means of written communication. In the course of the game, Turing exchanged one of the two counterparts with a computer and tested the recognisability again (Piccinini 2003, p. 112). Due to the success of the Turing test, expectations of AI systems became high. Due to various failures, such as in 1966 in the field of machine translation, there was a near standstill in AI research and development between 1960 and 1979 -- the so-called "AI winter" (Kilani et al. 2019, p. 24; Haenlein/Kaplan 2019). This ended with the proliferation of the expert system DENDRAL (Kilani et al. 2019, p. 24) in the 1980s. The system was able to analyse the structure of organic and chemical substances using mass spectrum data (Horn 1990, p. 62). Research and publications in the field of expert systems have also increased in marketing and brand management since the early 1990s (e.g. Neibecker 1990; Esch/Kroeber-Riel 1994; Hippner et al. 1998).

Joseph Weizenbaum developed ELIZA in 1996 as a prototype of communication between user and computer, comparable to today's chat bot. For the first time, he combined language and the philosophy of language through elements from literature, computer history, psychology and philosophy. The programme begins by narrowing down the topic by obtaining information through queries and

reflections (following the therapeutic procedure of psychologist Carl Rogers), thereby expanding the database and creating the impression of a dialogue by referring to this data (Höltgen 2019, p. 11 f.). The answers given out by the system result in a communication structure with content that appears intelligent to us humans.

Another milestone in the evolution of AI is the victory of the Deep Blue machine against the reigning world chess champion Garri Kasparow in 1997 (Newborn 2000, p. 27 ff.). The software developed by IBM is based on a search algorithm that searches 200 million chess positions per second in parallel and evaluates probabilities (Korf 1997, p. 1 f.). Only a year earlier, Kasparow had won the first test run against Deep Blue.

In 2011, the IBM Watson computer system beat Ken Jennings and Brad Rutter, two of the world's best Jeopardy! players. Through an open-domain question-answer system, which is similar in structure to a search engine, Watson first searches a database (consisting of Duden dictionaries, newspaper articles, encyclopaedias, etc.). Then, Watson forms hypotheses on topic areas from combinations (based on data from previous games) and ultimately outputs the answer to which the given clue could fit (Lally/Fodor 2011, p. 1; Ferrucci et al. 2012, p. 93 ff.).

The strategy game Go, a Japanese board game in which the opponent's pieces are to be surrounded by placing one's own pieces, is considered even more complex than chess (e.g. chess: 20 possible opening moves; Go: 361 possible opening moves). In 2015, a technology from Google DeepMind called AlphaGo defeated the reigning European champion Fan Hui (Wittpahl 2019, p. 7). Just one year later, the same software was already ready to beat world champion Lee Sedol, who had held the position for almost ten years (Yu 2016, p. 42). An algorithm searched for and combined the most optimal solution from previously programmed decision trees. This was done using a database of 300 million positions that had already been applied by experts (Yu 2016). In 2017, AlphaGo Zero was released, which defeated the previous AI, the most powerful to date, with a score of 100:0. The programme no longer relies on traversing search trees and expert knowledge, but was fed exclusively with the rules of the game and independently develops superior strategies and moves (Kirste/Schürholz 2019, p. 29).

Today, technology is used to build complex neural networks that are on the way to replicating humans. Currently, such extensive algorithms are combined in decision trees that it is sometimes inexplicable, both to developers themselves and to users, what exactly happens technically when a problem is found or solved (Xu et al. 2019, p. 563; Samek et al, 2017, p. 1). The upper part of Figure 1 clearly illustrates the flow of current AI systems and what questions arise around the output of the machine learning process. The lower part of the figure, on the other hand, shows the goal of the research.

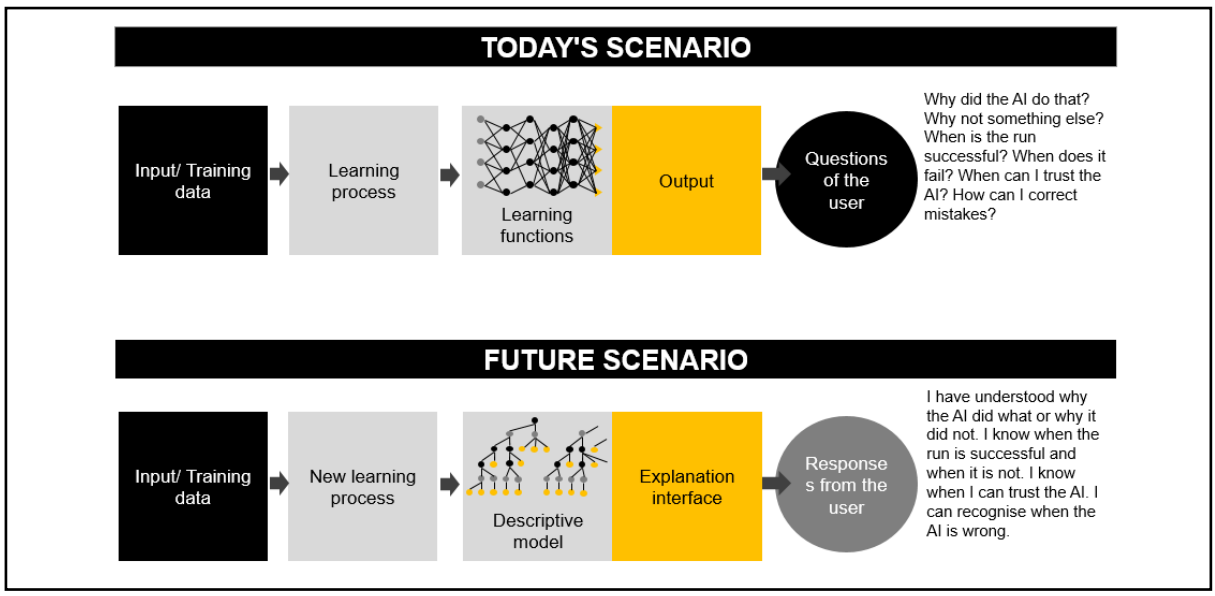

Figure 1: Current and future AI (Xu et al. 2019, p. 573)

It is now impossible to imagine everyday life without AI. From the voice recognition Siri (standard equipment of every iPhone) to the navigation system in the car or the spam filter in the email provider, AI has already become part of our professional and private environment in various forms. Therefore, it is necessary to understand what AI is, what distinctions there are and what we ultimately trust.

The term AI has already been used several times in the above section without explicitly defining it. Artificial intelligence (AI) is an umbrella term that encompasses all technical attempts to imitate human intelligence (Kaplan/Haenlein 2019). Figure 2 visualises the different manifestations of AI. As an umbrella term, AI includes rules and expert knowledge for imitating human thinking, in particular machine learning and deep learning, including artificial neural networks. Machine learning as a sub-area of AI deals exclusively with an everyday or a specific problem. Links between the problems are not possible. The above-mentioned Watson application from IBM belongs to this category. In this approach, various knowledge databases are used and combined to solve a problem. This class of AI is currently the most commonly used form of AI in business practice. The technology behind deep learning consists of several processing layers based on decision trees between algorithms. These lead to "learning" algorithms that imitate a replicated neural network. Very large amounts of data are needed as a basis for designing, analysing and evaluating logical conclusions and different solution paths. A still young application is the use of artificial neural networks in cancer cell detection. Here, high-dimensional data sets are analysed and processed. In current research, however, the success of cancer cell recognition is still heavily debated.

AI is also often further subdivided into weak and strong AI (for further classifications Kaplan/Haenlein 2019). In contrast to the previous, technical classification, this systematisation is based on the performance of AI. In weak AI, concrete human characteristics are replaced by machines and/or the recognition of patterns and objects (Beck et al. 2018). Concrete solutions result from corresponding algorithms. Applications include the Deep Blue or ELIZA systems mentioned above. Strong AI, on the other hand, encompasses machine and deep learning. Here, large amounts of data are analysed by algorithms and dependencies and commonalities are identified from the results (Beck et al. 2018). The goal of strong AI is to replace or even surpass humans. Strong AI solutions are no longer bound to individual, concrete tasks, but the "intelligence" is transferable to other and new task areas.

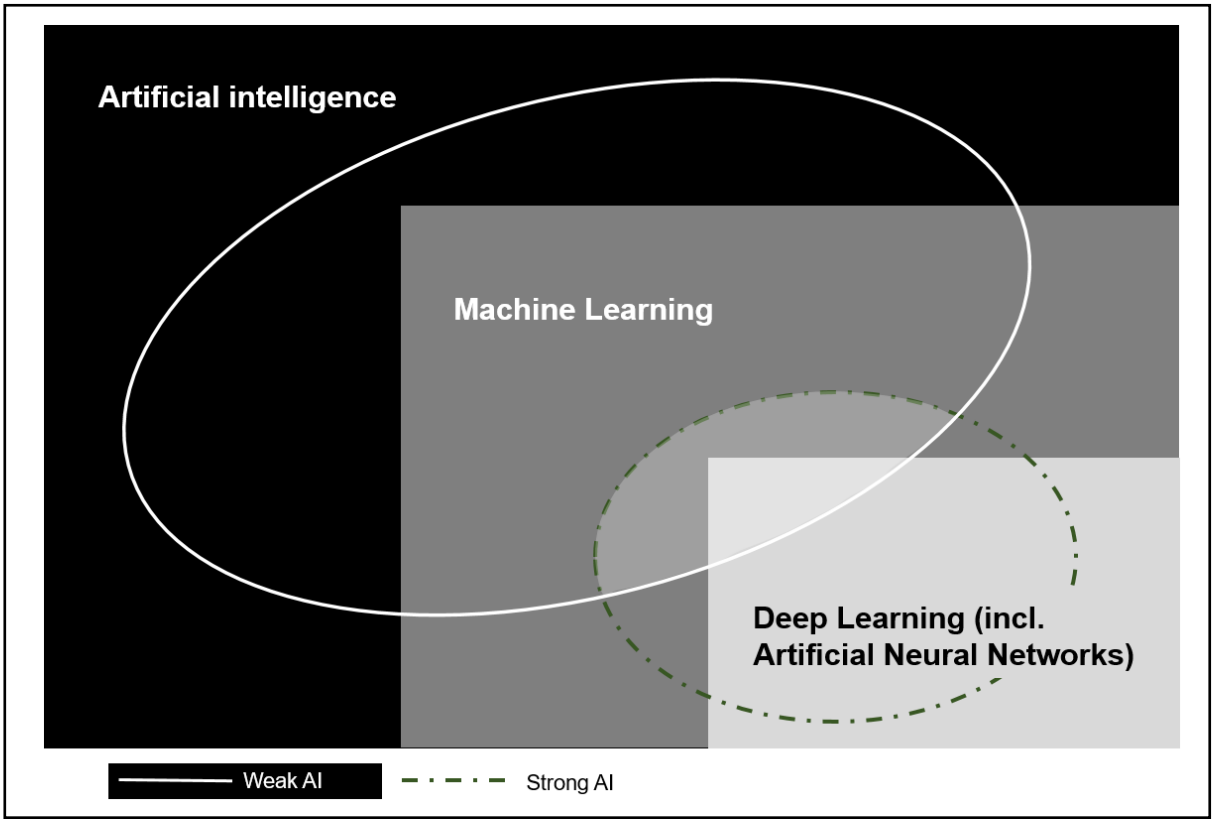

Figure 2: Overview of sub-areas of artificial intelligence (based on Menzel/Winkler 2018, p. 4)

3 Selected Areas of Application of AI in Brand Management

Similar to other management fields, brand management can be divided into an analysis level and a decision level, whereby there are many relationships between the levels and AI applications that are assigned to one level in the following also have potential for the other level. The analysis level includes in particular the analysis of individual brand contact points, the customer journey and the final brand strength or brand value. The brand management level focuses on the fields of brand positioning, brand strategy, branding, internal brand management, brand enrichment and brand-oriented marketing (Baumgarth 2014).

3.1. AI-Supported Brand Analysis

3.1.1. Social Listening

Social listening is the monitoring of digital communication of user-generated content about brands, companies, industries and other topics. A special category of social listening is sentiment analysis (synonym: opinion mining), which uses computers to measure opinions, attitudes and emotions regarding certain entities such as people, events, topics or brands (Liu/Zhang 2012, 415). Especially through social media, an almost unlimited number of opinions on brands are available on the web in textual (e.g. product reviews on AMAZON) and visual (e.g. Instagram) form. Social listening approaches help to continuously monitor and interpret the opinions expressed by users in computer-based communication. There are already a variety of user-friendly applications for sentiment analysis and social listening. Some of these AI-supported tools are, for example, Hootsuite (www.hootsuite.com), talkwalker/Quick Search (www.talkwalker.com) or RapidMiner (www.rapidminer.com).

Application areas for AI-supported sentiment analysis in the brand context are diverse and include e.g.:

- "early warning indication" for a shitstorm
- Providing input for improvements of the product and/or services
- Providing input for finding relevant brand content
- Analysis of target groups and audiences (e.g. IBM 2019b)
- Analysis of marketing and communication campaigns
- Measuring brand image and positioning of brands (e.g. Culotta/Cutler 2016; Netzer et al. 2012; Liu et al. 2018)
- Measurement of brand strength (Kübler et al. 2019).

At the heart of social listening is a "lexicon" that compares the content (e.g. blog posts) with the lexicon entries and thus categorises them (e.g. in sentiment analyses into negative, neutral and positive). In addition to manual compilation, the dictionary and corpus methods are particularly relevant for constructing these lexicons (Liu/Zhang 2012, p. 429 ff.). In the dictionary method, context-independent lists of terms are created. Such lists are also available as standard dictionaries such as LIWC2015 (www.liwc.wpengine.com). The corpus method, on the other hand, develops the necessary "lexicon" on the basis of an existing body of text. For example, such a corpus-based approach is based on starting with a small number of words with a specific opinion direction. Subsequently, large amounts of text are searched for these terms and adjacent terms are included in the lexicon in the same list (e.g. if they are linked to the word AND) or assigned to another list (e.g. if they are linked to the word BUT). An alternative approach combines an external criterion (e.g. star rating) with a text corpus to construct the "lexicon". The learning algorithm identifies terms that correlate particularly frequently with certain

expressions of the external criterion (e.g. Kübler et al. 2019; Liu et al. 2018). Meanwhile, the various AI-supported methods show a medium to high correlation or explained variance with classic survey data. For example, Kübler et al. (2019) report 13%-22% explained variance for brand strength size. Culotta/Cutler (2016) report correlations of 0.62-0.82 between AI-identified attributes and survey results. Netzer et al. (2012) found correlations of 0.43-0.55 between AI-identified brand similarities and survey scores. The range of possible applications of AI-supported social listening (or social seeing) is broad and will continue to develop in the future. Two examples will illustrate the current potential of AI-supported social listening: The IBM Watson Personality Insight solution (IBM 2019b) links social listening with personality theories. Any type of text can serve as input material (e.g. texts from a Twitter account). These are then evaluated and assigned to personality dimensions (see the personality profile of the current pope in Figure 3).

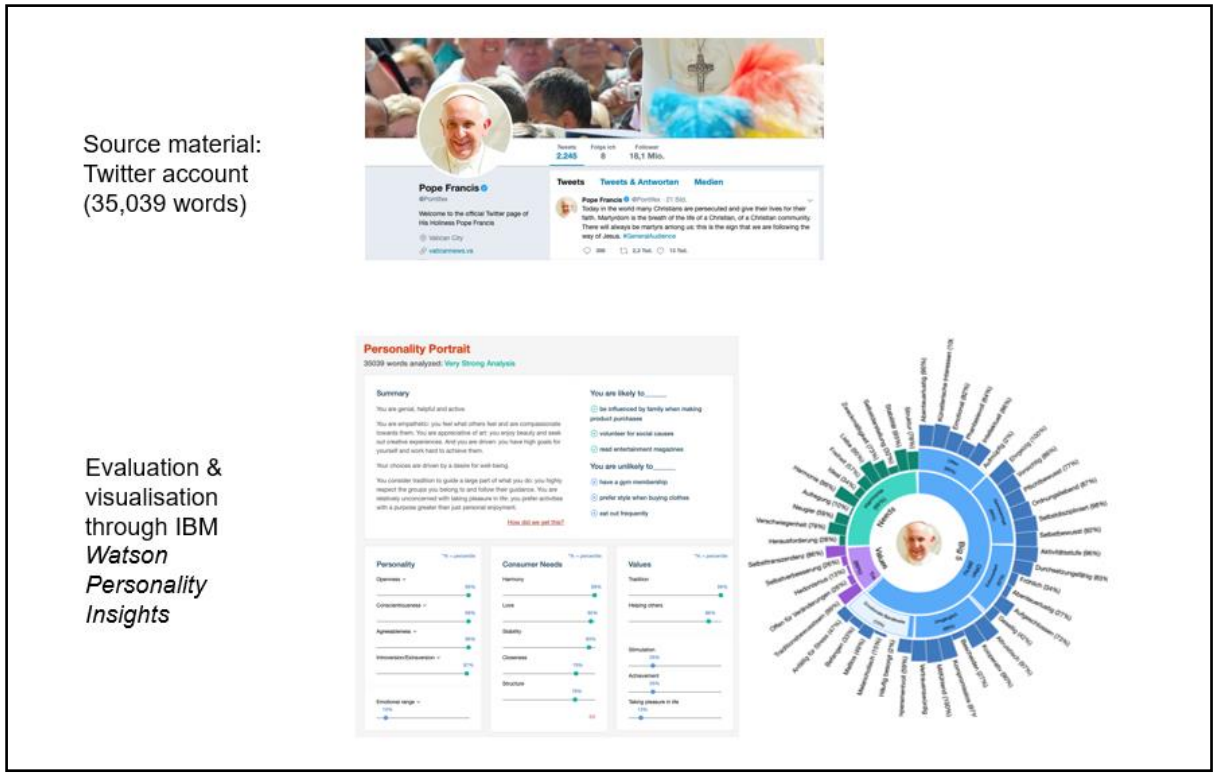

Figure 3: Personality analysis from IBM Watson Personality Insight (IBM, 2019b)

First of all, people and groups of people can be automatically described and grouped. Based on this, individualised services and communication can be offered. In principle, however, it is also conceivable that this tool can be used for the analysis of brand personality (general Aaker 1997; Davies et al. 2018), even if the dimensions of human personalities differ from brand personalities.

A second example is provided by the Google Vision AI solution (Google 2019a), which focuses on analysing images. The respective evaluation reports the components that are recognised by the solution. Figure 4 presents an example of the results for a photo of one of the authors. The evaluation shows that,

among other things, the building with the corresponding location, the emotion of the person and the objects depicted in the picture were recognised.

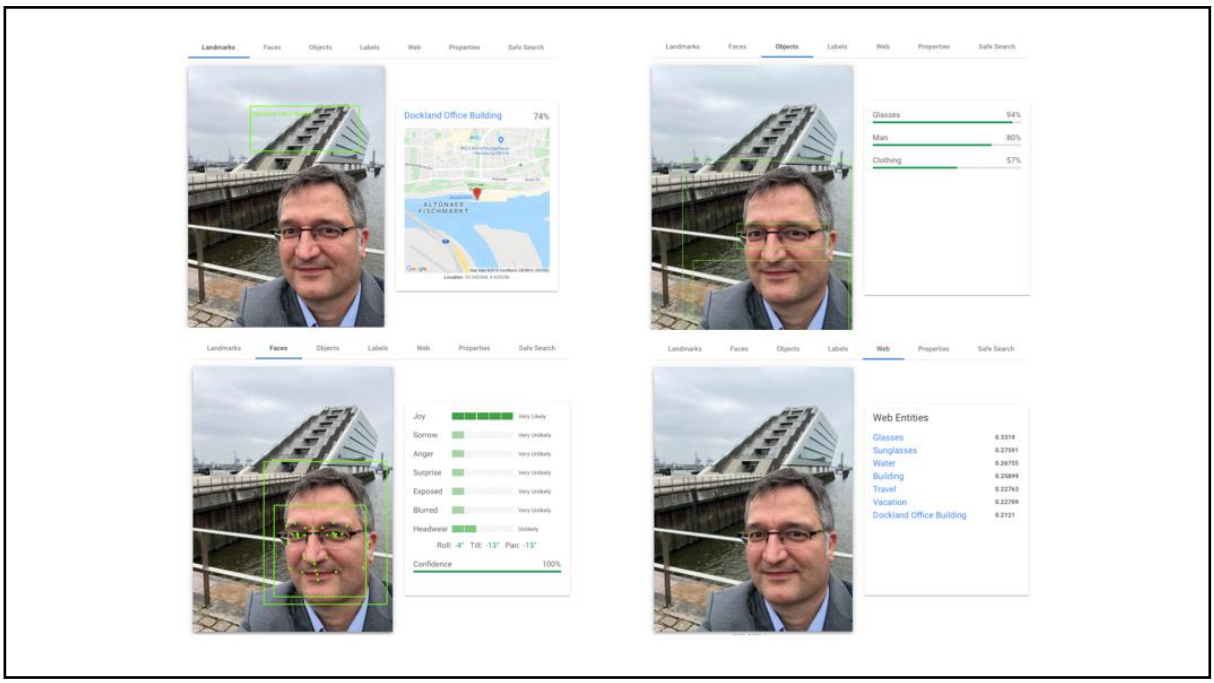

Figure 4: Social Listening for images using the example of Google Vision AI (Google, 2019a)

Although social listening is in principle also possible without AI and is in part (still) more accurate with human support (e.g. Culotta/Cutler 2016), the use of AI has the following advantages in particular for this area of application:

- Fast, context-specific and up-to-date construction of the necessary lexicons through machine and deep learning.
- Fast, low-cost and continuous (24/7) execution and evaluation of social listening
- Automatic and quantitative recognition and evaluation of text and images (Liu et al. 2018).

3.1.2. Substitution of Classic Brand Research

As already outlined in the chapter on social listening, AI-based solutions partly enable the replacement of classic brand and market research. Social listening is about the substitution of classic, large-scale surveys and qualitative techniques such as group discussion or ethnography. In addition, it is also discussed whether AI solutions can replace classic instrumental observation techniques or develop them further in a meaningful way. Two areas of application, eye tracking and emotion measurement, are outlined below.

(1) AI-supported Eye Tracking

A first area of application is the already classic, device-supported eye tracking (e.g. Duchowski 2017; Holmqvist et al. 2011). In the classic method, a stationary or mobile camera (helmet, glasses) records the gaze of test subjects and then divides it into so-called fixations ("points" with a longer observation time, usually 150-600 milliseconds; Duchowski 2017, p. 44) and saccades (very short observation time). The results are presented in so-called heat maps, gaze plots and statistical parameters such as fixation duration and time until the first fixation of areas of interest. Typical areas of application in brand management are optimisation of communication media (e.g. advertisements, posters, TV spots), branding, shelf space and shops as well as UX testing (e.g. websites, apps, packaging). Companies like the US company mixpanel with its solution Heat-Map.Co (www.heat-map.co), the Israeli company Feng-GUI (www.feng-gui.com) or the German company AttentionInsight (www.attentioninsight.ai) offer AI-supported "eye tracking studies". In essence, these machines learn to recognise patterns based on expert knowledge and/or from real eye tracking studies, apply these to new objects such as designs for websites and estimate consumers' gaze trajectories through an algorithm. Even though the providers state that the results of the AI-based systems match the results of classic eye tracking studies by up to 90 %, a recent study (Bresinsky et al. 2019) shows that so far these only provide valid results for simple stimuli and not for complex images (e.g. artwork "Unexpected Homecoming" by Ilya Repin, which also formed the basis for a famous eye tracking study (Yarbus 1967)).

(2) AI-Supported Emotion Measurement via Facial Recognition

An important and challenging topic for brand research is the measurement of emotions. In the past, a variety of verbal and non-verbal methods have been developed for this purpose in the context of advertising and brand research (for an overview, e.g. Hazlettt/Hazlett 1999), which, however, show strong distortions due to cognitive control and the subsequent memory performance. An alternative and already classical method is based on the observation of facial expressions and the systematic evaluation of so-called micro-movements. The best-known method is the Facial Action Coding System (FACS) (Ekman/Friesen 1976). However, this method is time-consuming. Automated methods that combine facial recognition with a continuous evaluation of these micro-movements reduce this time expenditure. In addition to facial recognition, AI is also responsible for interpreting facial expression changes. AI-based solutions on the market include AFFDEX by AFFECTIVA (www.affectiva.com/product/affdex-for-market-research/) and FaceReader by Noldus (www.noldus.com/human-behavior-research/products/facereader). There are also initial studies that compare the quality of these methods with alternative methods (e.g. Stöckli et al. 2018; Lei et al. 2017; Teixeira et al. 2011; Kulke et al. 2018) and attempt to determine the validity and explore the possible areas of application of automated face and emotion recognition. In addition to brand analysis, such methods are also suitable for individualising

brand communication and the interaction between brand and consumer. Examples include the service robot Pepper (www.softbankrobotics.com/emea/en/pepper; Guillén et al. 2018), which is equipped with face and emotion recognition, or the current "Symphony of better" campaign by Aspirin and Spotify (www. symphonyofbetter.de).

3.2. AI-Supported Brand Management

3.2.1. Media Planning and Digital Advertising

AI in marketing, at implementation level in brand management, comprises data-driven market cultivation, supported or automated by tools for the analysis of existing data, automation of predefined action sequences and independent optimisation of action sequences (Wagener 2019, 65). Extensive data on user and purchasing behaviour is available, especially in the field of online marketing. This can be particularly helpful in the context of brand communication when planning content and its playout. Up to now, the business area of playout was primarily reserved for media agencies. With the increasing user-friendliness of these media tools, however, the competence is returning to the marketing departments of companies. So far, however, the individual operators for automated media playout offer only isolated solutions.

The Facebook Business Manager (BM), for example, includes media planning and control for the Facebook (FB), Instagram, Messenger and WhatsApp platforms. It is the largest social media platform that does not create its own content (Nissen 2017, 48). The service provided by the BM is therefore the provision of cumulative user data, clustered by location, age, language, gender and other characteristics (e.g. interests and behaviour) (Facebook 2019). Based on this, advertising measures can be played out to specific target groups. Since the database is constantly growing due to user behaviour, new interest groups can be made available on the system side for targeting, such as the target group selection according to "interest in future events" or "API developers who have used the FB API in the past 90 days" (Facebook 2019). This makes targeting even more specific to the target group. Facebook also offers the option to exclude people or groups of people from a selection. However, this selection is similar to the target group selection already mentioned. Facebook plays the advertisements to all end devices registered per user, to whose specifications the advertisements are adapted. Since hardly any users can be reached via organic posts today (which also requires a notable number of subscribers), advertisers have to resort to paid placements to reach their target group (Kamps/Schetter 2018, 13).

The Google Marketing Platform (MP) is a merger of Doubleclick and Google Analytics 360 Suite. These are already further developments of the Google AdWords platform published in 2000 for purchasing placements in Google search results. Since 2018, Google offers a bundle of services consisting of a survey tool (Surveys), analysis tool (Analytics), campaign planner for display ads (Banner and Gmail), video ads via YouTube (Display & Video 360) and SEA targeting (SearchAds 360). Moreover, setting

of events to track the user journey on the website (Tag Manager), the optimisation of website content according to target group interests (Optimize) and the preparation of data in reports (Data Studio) (Google 2019c) is also possible. This makes it easier for the advertisers themselves to independently to plan, target and optimise services and measure the success of campaigns. With a market share of 94%, Google is the number one search engine used in Germany (Kamps/Schetter 2018, 42). With every search entry, every campaign created and implemented, Google's own data pool becomes ever larger. This large amount of data holds great power, especially when it comes to decisions for and against the display of advertisements (Kamps/Schetter 2018, 15). The Google Display Network currently comprises of two million websites and apps (Google 2019b). Google crawls the pages for content, categorises and evaluates them, then assigns them to the booked display ads. This allows placements to be precisely matched to target groups (Kamps/Schetter 2018, 44).

Both Facebook and Google are marketplaces where, comparable to an auction platform, bids are made for placements for advertising media. The higher the demand for a position or a target group, the more expensive the display. The control of the advertising media is primarily carried out through so-called programmatic advertising. This data-supported action of advertising placements is in the trade with TV spots, with out-of-home advertising spaces or marketplaces such as the BM or MP no longer only offer data on the environment in which an advertiser expects the target group to be, but is primarily based on the user (i.e. the target group). Target group-specific requirements can be combined. Characteristics of a target group to be combined are socio-demographic information and interests, the content of the environment of the placement by keywords, the semantic context of the keywords, user profiles, the accessibility and use of end devices as well as the mood of the user.

Globally, Boston Consulting Group consultants estimated that in 2017, almost half of digital advertising (49%) was already Programmatic Advertising. For 2020, they predicted an increase to 63% (Rosenzweig et al. 2018).

3.2.2. Voice as a Branding Element and Touchpoint

The use of voice assistants, also referred to as Virtual Personal Assistants, Conversational Agents, Personal Digital Assistants, Voice Activated Personal Assistants or Intelligent Personal Assistants (Cowan et al. 2017), and their importance to consumers and brands are increasing. Most consumers are already familiar with at least one of the following voice assistants: Alexa (Amazon Echo), Google Assistant (Google), Siri (Apple) and Cortana (Microsoft). It is estimated that in 2020, approximately 4.2 billion voice-controlled assistants were used in devices worldwide, and this number is expected to increase to over 8.4 billion units by 2024 (Juniper Research 2020). Not only is usage increasing, but so is the amount and quality of functionality. Consumers are using these devices for search queries, to control other devices, to leave messages, to connect and, in the future, increasingly for shopping, which

is referred to as voice commerce. Although some consumers are using these Virtual Assistants for functional tasks, a growing number of consumers in certain segments, such as people with special needs, are also developing a more emotional connection towards the assistants and see the role as a friend, companion or caregiver (Ramadan et al. 2020).

As a result, AI-driven voice assistants are also increasingly becoming an important and additional touchpoint for brands (Seitz 2019; Besik 2019; van de Sand et al. 2017). Voice assistants use AI-based technologies such as Natural Language Understanding (NLU), Natural Language Processing (NLP), Natural Language Generation (NLG), Speech Recognition and Dialogue Management, and are continuously evolving into human-like conversational partners. However, this also presents the additional challenge for brands, namely how to accurately brand a voice and assign a personality to the voice that reflects the brand and allows consumers to recognise it as such.

VisionOne, for example, has developed several Brand Archetypes such as Caregiver, Creator, Explorer, Hero, Innocent, Fool, Lover, Magician, Rebel, Regular Guy or Sage (See www.visionone.co.uk/research-services/consumer/brand-research/). McLaughlin suggests developing an explicit personality for chat bots using the Bot Personality Canvas for AI (McLaughlin 2019). Research into brands and brand personalities has already gone a step further and turned to voice branding. Collaborations between Copenhagen Pride, Virtue, Equal AI, Coalition Interactive and Thirtysoundsgood identified the problem that most voices used by assistants use a male or female voice, but do not offer a neutral voice. Thus, the first genderless voice called Q was created with the intention of eliminating any gender bias in AI assistants (See www.thirtysoundsgood.dk/?flv_portfolio=q-the-worlds-first-genderless-voice).

Other consultants have also investigated how to translate brand personality into voice. The brand consultancy MetaDesign and the market research institute Eyesquare conducted a conversation branding study that examined how bots and voice assistants can be given a brand voice personality. Prototypes were developed for the brands Car2go, Zalando, Redbull and Commerzbank. For example, the relaxed "Mattis" embodies Redbull, the sociable and friendly "Julian" embodies Car2go, the likeable "Anne" embodies Zalando and the competent "Thomas" embodies Commerzbank (MetaDesign 2019; Otto 2019). Brands must therefore not only consider the use of voice assistants in general, but think one step further and integrate the digital voice into branding as a consciously designed branding element.

3.2.3. Brand Experiences and Personalisation

Recommendation systems, bots and service robots are helping to tailor advertising, videos, images, texts, products and services closer to consumer preferences and needs than ever before. Digital technology, including AI, is enabling new brand experiences, such as a revolution in the brick-and-mortar shopping experience. When Amazon Go opened its first shops in 2018, the combination of computer vision, sensors and AI enabled consumers to check-in to one of the shops with a QR code in the Amazon Go app, shop, leave the shops with all the purchases directly, with payment made through the consumers' Amazon account (Amazon.com 2019). So it's a cashierless, cashless and seamless experience.

In addition to new physical experiences, AI technologies have also enabled brands to meet consumers' increasing demands for customisation. This is an important factor as consumers will even consider switching to another brand if, for example, personalised content is not offered (Suarez 2017). Personalisation means tailor-made offers for an individual consumer (Charlesworth 2018). Through AI-driven personalised engagement marketing, brands are able to create, communicate and deliver offers while making more accurate and timely predictions about future needs (Kumar et al. 2019). Recommender systems are one example of how brands are implementing personalised offers. Brands are increasingly personalising content for users, the clothes consumers can shop for, the music they can listen to, and other offers that should appeal most to the consumer, without requiring him or her to sift through a large amount of information or endless choices. Recommender systems are based on algorithms that deliver information that most appeals to the user. Two commonly used systems are Content-Based and Collaborative-Based recommendation systems. Content-Based recommendation systems compare a "user profile" (of a consumer) and an item (product, advertisement, video or image content). Through explicit and implicit feedback from the user, past items are linked to preferences based on activities such as viewing, clicking, liking or buying. New items are evaluated based on past feedback and by evaluating attribute similarity, a recommendation is predicted to be displayed to the user (Ricci et al. 2011). Collaborative-based recommendation systems, on the other hand, analyse past interactions of a broader user base on a platform to create rankings and predict what should appeal to the individual consumer based on other users or other items (Pinela 2017).

Examples of such applications can be found on online platforms such as Amazon, Netflix, Spotify, Alibaba or Hulu. The entertainment platform Netflix uses recommendation systems based on machine learning to offer consumers series, TV shows, movies and other video content. The Netflix Recommender Systems (NRS) and their features are becoming a major competition for other providers (Pajkovic 2021). The first factor includes movies, shows or videos that the consumer (in this case the user) has previously watched himself and how he rated them. The second factor includes recommendations based on films, shows and videos that other users with attributed similarity have

watched in terms of similar tastes. The third factor is based on information about genres, actors and the year the video was produced (Netflix 2019). The artwork depicted on the thumbnails is also personalised to the viewer, based on previous viewing behaviour and the associated increased likelihood that this will be of most interest. A few years ago, it was reported that about 80% of the content consumed came from the Netflix recommendation system (Lin et al. 2016). In a recent case study of Netflix, the company itself noted that the recommendation system is the primary means that leads to users watching new content (Lamkhede/Das 2019).

3.2.4. Brand Content

So far, AI has been discussed and implemented especially for the automation of tasks such as social listening, personalisation and marketing automation. Increasingly, however, it is becoming apparent that AI is also capable of at least supporting the creation of new content. Applications such as the automated creation of weather reports, sports news, financial information or product descriptions based on data are already almost standard today. Companies like AX Semantics and Retresco/rtr textengine (both Germany), Arria (UK) as well as Automated Insights and Narrative Science/Quill (both USA) offer corresponding services to publishers, e-commerce shops and other providers. Examples in other fields show that AI also has potential for more creative and complex tasks. As early as 1957, the Illiac Suite (Hiller and Isaacson 1958) was published as the first computer-generated piece of music (YouTube 2016). In 2016, the search engine Baidu presented an AI solution that "translated" images into music based on the colours and objects depicted (Plass-Fleßenkämper 2016). In 2016, Oscar Sharp produced the approximately 9-minute science fiction film Sunspring with the help of a neural network (Newitz 2016). In 2019, the renowned scientific publisher Springer Science published the first AI-generated scientific book, the monograph Lithium-Ion Batteries (Writer 2019). In 2016, the successful artificial influencer Lil Miquela (Instagram: 3 million followers, as of August 2021) was created by the US AI company Brud (Miquela 2021; Luck 2018). In 2018, the auction house Christie's auctioned the entirely AI-generated painting 'Edmond de Belamy', a portrait painting of the youngest scion of the fictional Belamy family, for €380,000 (see Figure 5) (Chrisitie's 2018). Behind this artwork is the French artist collective Obvious, which trained the algorithm with 15,000 portrait images from the 14th to 20th centuries. The research team led by Elgammal et al. (2017) developed a new algorithm for creating art (Creative Adversarial Networks) and conducted a series of experiments in which people assessed the creative and aesthetic quality of AI-generated art compared to human-produced artworks (images were used from the exhibition catalogue of the Art Baseln2016 art fair). The participants were asked to decide whether a human created the artwork in question or a machine. The results showed that people could not tell the difference between AI and human art and that the aesthetic quality (e.g. like, novelty, surprise) of AI art was rated the same and in some cases even higher.

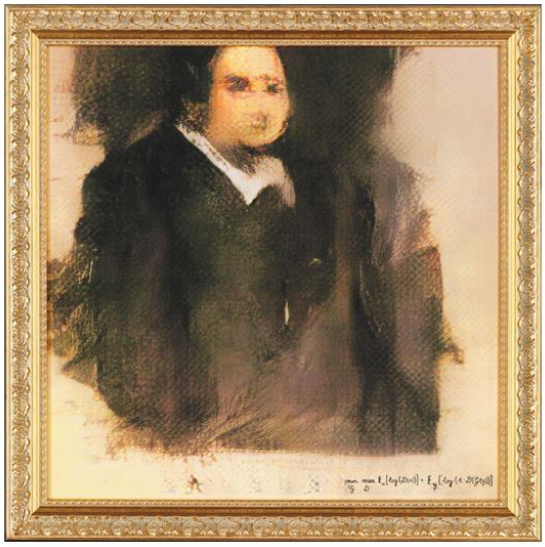

Figure 5: AI portrait of "Edmond de Belamy" (Christie's, 2018).

Also in brand management, the first applications for the creation of brand content can already be found. For example, platforms such as Logo AI (www.logoai.com) or My Brand Logo (see www.mybrandnewlogo.com) support the development of branding. The company Wibbitz creates video sequences for brands from text (www.wibbitz.com). The Ferrero brand Nutella, building on the campaign launched in 2014 to individualise the brand label through user names, has been offering seven million Nutella jars with individual labels generated by AI since 2017, starting in Italy as part of the Nutella Unica project (Ogilvy Italia 2017). In 2018, Japanese manufacturer Toyota developed the roughly unanimous spot "Driven by Intuition" for its premium brand Lexus. What makes the TV spot special is that the script and screenplay were created by an AI trained with successful campaigns of car and luxury brands from Cannes Lions over the last 15 years, "Emotional Intelligence" from video service provider Unruly (www.unruly.co) and brand-specific guidelines from Lexus (Rondinella 2018). Even if the examples are still isolated cases and in many cases the term AI is (still) more important for the success of the campaigns and projects than the brand content itself generated by algorithms, these show possible future developments. The following factors in particular will be decisive for the successful use of AI for creation in the brand context:

- Generation of brand-specific content: Since current applications derive their content from a pool of general data, there is a risk that content will be interchangeable and not very brand-specific.
- Design of new work routines for the interaction of AI and creatives: AI will not replace creation in the near future either, but will meaningfully relieve creatives of routine tasks and inspire them with new creative tasks.

- Acceptance of AI-created content by consumers: A recent study (nextMedia Hamburg, 2019) shows that the German population is partly sceptical, but already accepts AI-created content in certain areas (see Figure 6).

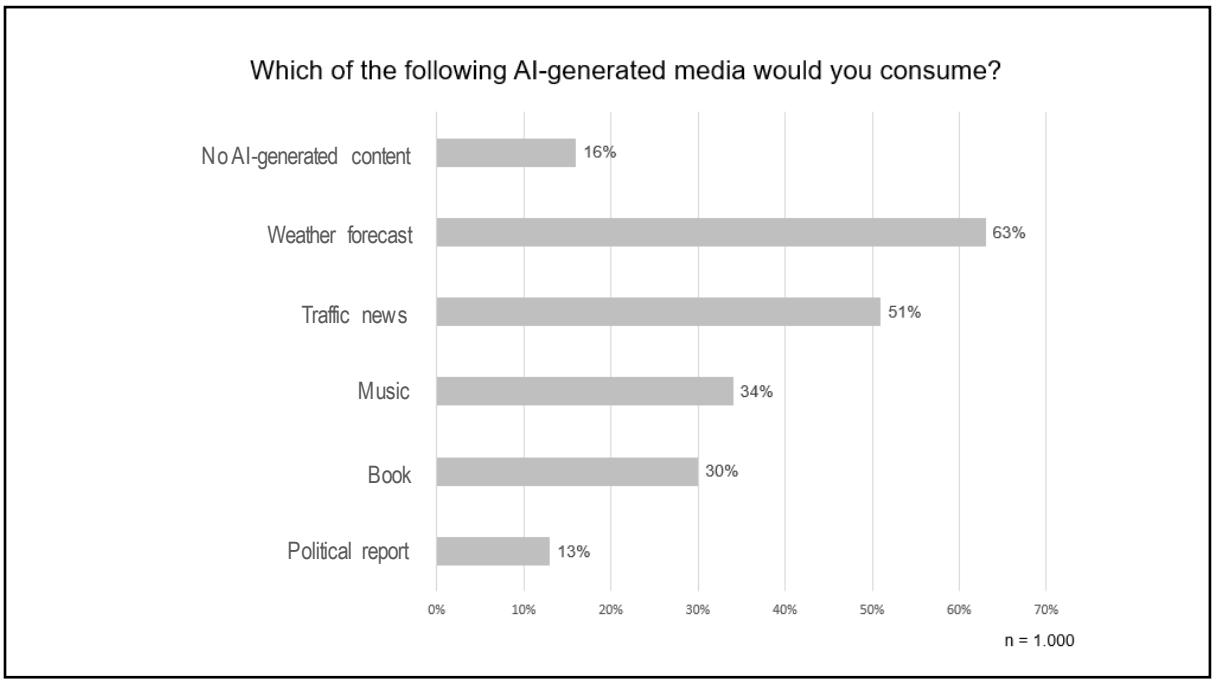

Figure 6: Acceptance of AI-generated content among the German population (nextMedia Hamburg, 2019).

4 Limits of the use of AI in brand management

The previous chapter used examples and initial research results to illustrate the diverse potentials of AI for brand analysis and brand management. However, the use of AI is also linked to a number of barriers, which are outlined in this chapter.

Knowledge and Skill Deficits

Meaningful use of AI in brand management requires corresponding knowledge and skills on the part of those responsible for the brand. In the discussion on digital transformation, various models and reference frameworks for management in general and marketing in particular have been developed and partly empirically tested (e.g. Sousa/Rocha 2019; Baumgarth/Binckebanck 2017; see also the self-test by CapGemini, 2019). Also at the level of the individual employee, new skills are being discussed in the context of digitalisation, such as data literacy (e.g. Baumgarth et al. 2019). All of these approaches assume that the knowledge and skills profile of individual brand managers and the entire brand organisation will have to change dramatically in order to make meaningful use of digitalisation in general and AI in particular. However, these skills have been predominantly lacking until now. In

addition to the demographic profile of managers, this is also a failure of current (university) education, which has so far only rarely integrated the topic of AI into marketing and brand education. A future-oriented university education must include topics such as AI applications, data protection and ethics in the curricula in addition to basic AI skills such as data literacy and programming, and also keep a level of flexibility surrounding the content being taught as topics in this field can change quickly. Furthermore, the speed in the digital field is so high that continuous further training of lecturers will also be necessary in the future and must be included in the job description of professors ("lifelong learning": Continuing education as a compulsory task with corresponding adjustment of teaching loads).

Insufficient Data Quality

AI is based on learning from existing data in addition to the algorithms used. The quality of AI solutions therefore depends crucially on the quality of the data. In a well-known study on image classification, for example, an "error" in learning could be generated by the fact that dogs (husky) were always shown without snow and wolves were always shown with snow in the database. This caused the AI to distinguish wolves and dogs based on the background, which resulted in a husky in the snow being incorrectly recognised as a wolf (Riberio et al. 2016). This example shows, on the one hand, that the quality of AI depends on the quality of the data. A bias in the data leads to the algorithm learning incorrectly. Secondly, it shows that it is necessary to understand and control the decisions of an algorithm. Without this human "control", errors can occur, which also reduces the credibility and thus the acceptance of the AI solution. For brand management, this means generating "good" data on the one hand and understanding and controlling AI solutions on the other.

Loss of Trust and Fear

Brands live on the trust of consumers and customers. AI is not only scary in science fiction books and films, but is also viewed critically by the majority of consumers. For example, a population-representative study in Germany found that 26% of respondents rated the risks of AI higher than its benefits and only 15% rated the benefits higher than the risks. As Figure 7 shows, consumers are particularly opposed to AI in fields where judgements and equity are at stake.

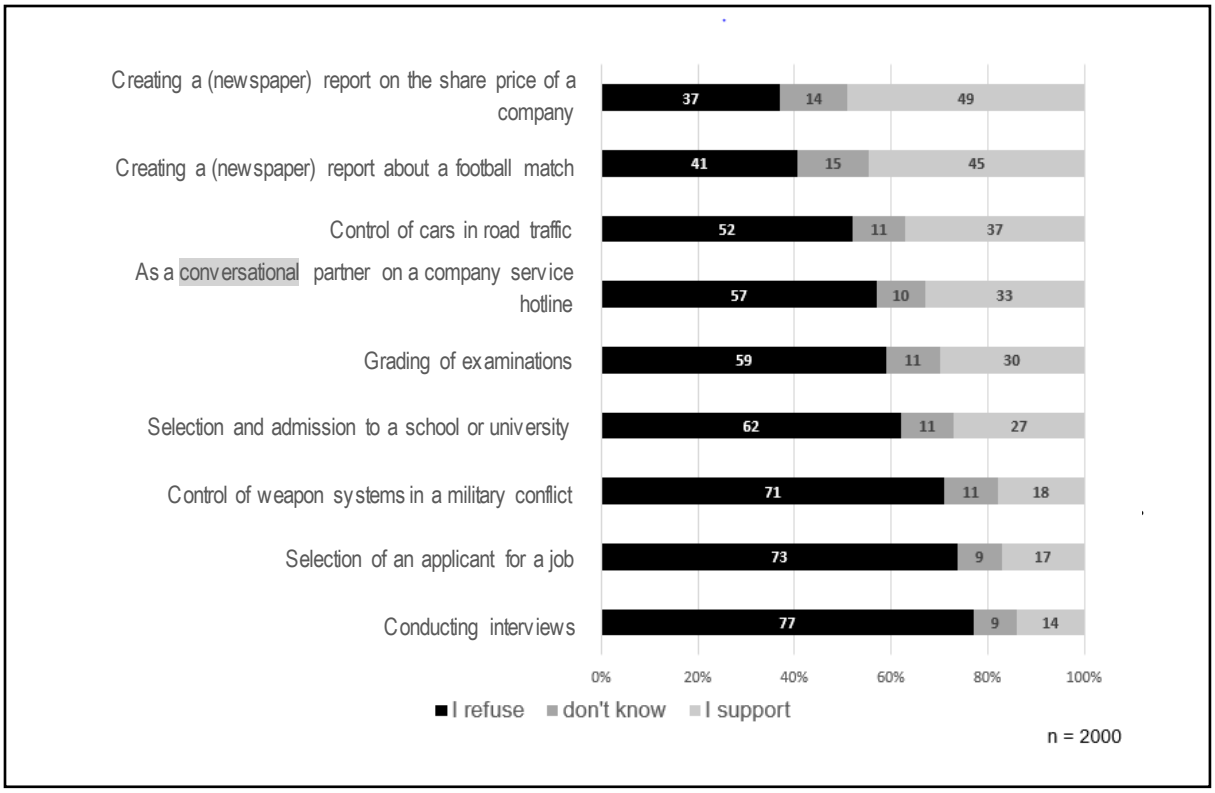

Figure 7: Rejection and acceptance of AI deployment areas (YouGov 2018, 4).

But also in robotics, the so-called "Uncanny Valley effect" shows that consumers can develop negative feelings if, for example, a robot becomes too human-like (Mori 1970; Phillips et al. 2018). In the field of journalism, there are initial studies investigating the perception of AI-generated news (e.g. financial and sports news). Graefe et al (2018) were able to show for "simple" texts that AI-generated texts have a high level of credibility and expertise, especially if the computer generation was made recognisable. Clerwell (2014) investigated perceptions of computer-generated news articles compared to those of journalists, based on several criteria. The results show that participants perceived AI-generated news articles as more trustworthy, informative and objective, while those written by journalists were more enjoyable to read.

Relatively little is known about how consumers react to AI-generated brand content and interactions. However, it can be assumed that the use of AI has an effect on (brand) trust. Therefore, brand managers need to address whether and in which areas they use AI, how human-like they design the interface (e.g. bots, robots) to the consumer and whether and how they make the use of AI transparent.

Past Orientation

Currently, most AI solutions used in business practice are based on weak AI that can recognise patterns from a variety of data and apply them to future decisions. Since this type of AI learns from past data,

the results also tend to be conservative and reproduce patterns rather than creating something new. Especially for the development of completely new brands, for the derivation of new positioning or for the creation of surprising and rule-breaking communication approaches (already Gaede showed that deviating from the norm is a central success factor of brand communication; Gaede 2002), weak AI can only contribute little. Therefore, it is important to assess which tasks have more of a routine character and can therefore be well supported or taken over by AI and which brand management tasks, on the other hand, require more empathy and creativity and are thus better fulfilled by (creative) humans.

Responsibility Dilemma

Not only in the field of medicine or autonomous driving must the ethical responsibility of the use and the resulting consequences always be considered in the field of AI. Digital ethics should also be discussed much more in the brand sector. An example of the ethical responsibility of brands through automation and AI is the discussion initiated by the then Scholz & Friends manager Gerald Hensel at the end of 2016/beginning of 2017 (hash tag: #keinGeldFürRechts) on the automatic placement of advertising banners on right-leaning sites without the brand managers even knowing about it (Wegner 2016). In 2017, some large brand companies in the USA announced that they would abandon programmatic advertising on YouTube, as this platform cannot ensure that the automatically played advertising videos are not played in front of racist, sexist or other unethical video content (Wakabayashi/Maheshwari 2017). As countermeasures, concepts such as blacklists and whitelists of advertising environments and control mechanisms such as overviews of playouts that have taken place have been discussed and implemented for some time under the catchphrase "Brand Safety & Suitability" (in detail IAS 2019; VDZ 2018; Cheq et al. 2018).

But also the discussions about data protection and abuse including corresponding legislation such as the European General Data Protection Regulation (GDPR) affect the use of AI in the brand context, as customer and user data predominantly form the basis for AI learning. In addition, other approaches associated with AI and marketing automation, such as chat bots, dynamic price adjustment or automated personalisation of offers, products and communication, are repeatedly the subject of critical discussions. Finally, the high-energy consumption of AI solutions is also currently being discussed (e.g. Strubell et al. 2019).

In addition to complying with the applicable legal requirements within the framework of compliance management, brand managers should therefore also increasingly discuss and decide on their own ethical standards, comply with them and publish them transparently in order to ensure brand trust. Various networks and initiatives such as "Partnership on Artificial Intelligence to Benefit People and Society" (see www.partnershiponai.org), "Algorithm Monitoring Initiative D21" (see

www.initiatived21.de/arbeitsgruppen/ag-ethik/uag-algorithmen-monitoring/) and "Algorithmwatch" (see www.algorithmwatch.org) also provide starting points.

5 Conclusion

The explanations have made it clear that AI will also change and influence brand management in various fields. Building on a general discussion of the relationship between AI and humans, Figure 8 shows the influence of AI on brand management from today's perspective.

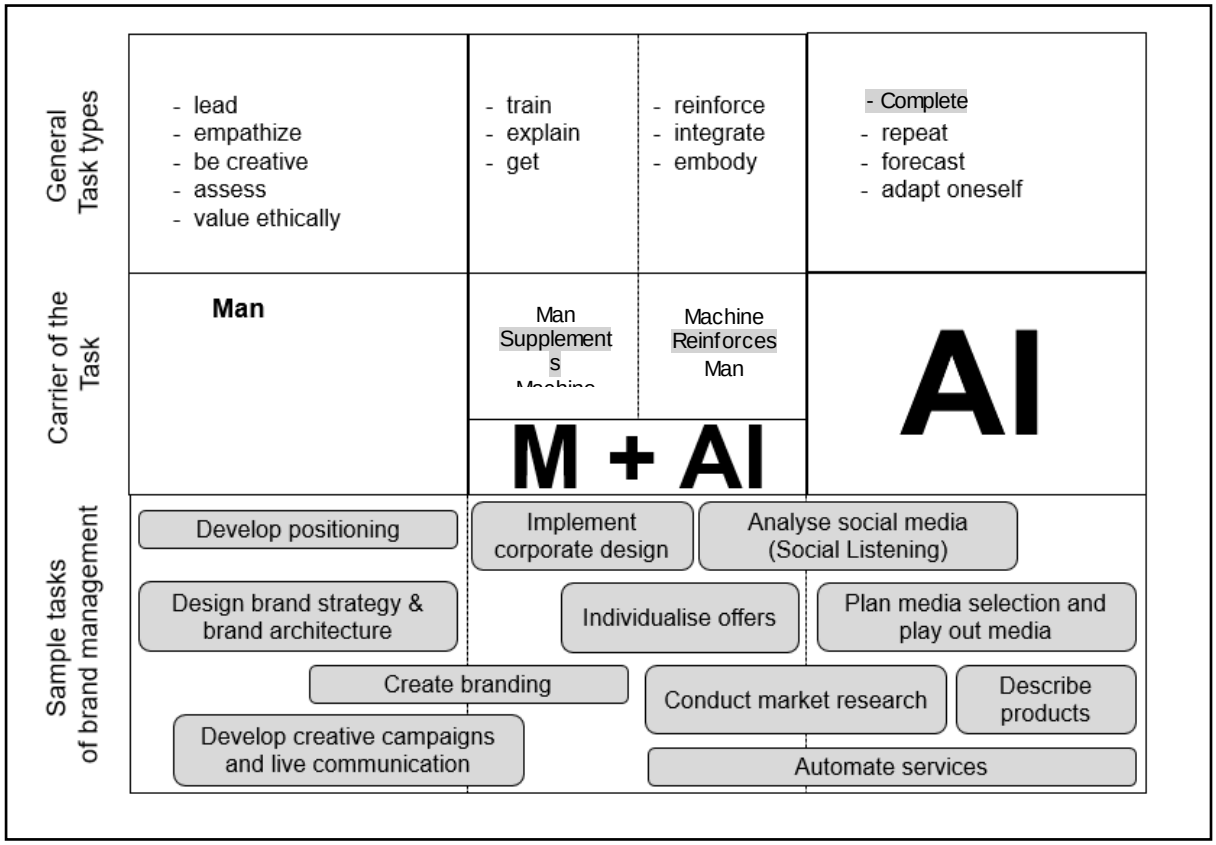

Figure 8: AI and branding (adapted from Daugherty/Wilson 2018, 16).

Furthermore, the explanations show that from a research point of view, the field of AI and brand is not only a very broad field, but also one that has hardly been researched so far and therefore many research questions need to be addressed in the future. One challenge of this research field is the high speed of changes in AI solutions. Therefore, research in this field requires a high speed in the implementation, but also in the publication processes (perhaps, following the example of computer science, a higher weighting of conference publications to the detriment of journal and book publications is recommended). Furthermore, in this field, interdisciplinary cooperation with AI scientists and AI companies will be necessary, but also challenging.

Finally, digitalisation and AI will also mean that university teaching and further education will have to change fundamentally. In addition to a thematic integration of the AI topic into the teaching of marketing and brand, the teaching of new key qualifications such as data literacy, coding, but also creativity and ethics will become more important. Furthermore, it will become clear whether and how AI will also revolutionise the tools of teaching. Initial approaches include AI-supported selection processes for degree programmes and automated control of tests and exams (Küchemann 2018), the use of robots as "teachers" (e.g. use of the robots Pepper and Nao at the University of Marburg) and individualised teaching and learning programmes (e.g. Popp et al. 2018).

References

Aaker, J. L. (1997): Dimensions of brand personality, in: Journal of Marketing Research, 34(3), pp. 347-356.

Amazon (2019): Amazon Go, Online: https://www.amazon.com/b?ie=UTF8&node=16008589011 (18.12.2019).

Ameen, N., Tarhini, A., Reppel, A. and Anand, A. (2021): Customer experiences in the age of artificial intelligence, Computers in Human Behavior, 114, 106548.

Ammermann, W. (2019): The Invisible Brand: Marketing in the age of automation, big data, and machine learning, New York: McGraw-Hill Education.

Baumgarth, C. (2014): Markenpolitik: Markentheorien, Markenwirkungen, Markenführung, Markencontrolling, Markenkontexte, 4. Aufl, Wiesbaden: Springer.

Baumgarth, C. and Binckebanck, L. (2017): Digitaler Champion im Marketing, Industrieanzeiger, 28, pp. 22-23.

Baumgarth, C., Kirkby, A., Müller, R. M. and Boltz, D.-M. (2019): Data Literacy of Brand Managers: Relevance and Framework, Proceedings The 3rd International Conference on Business, Ho Chi Minh City Open University (Vietnam), 74.

Beck, H., Anastasiadou, S., and Meyer zu Reckendorf, C. (2018): Grenzen des Wissens, in: Beck, H., Anastasiadou, S., and Meyer zu Reckendorf, C. (ed.), Faszinierendes Gehirn, 2. Aufl., Heidelberg: Springer, pp. 322-337.

Besik, H. (2019): 91% of Brands are Investing in Voice: How to Make it Work, [online] Available at: https://theblog.adobe.com/91-of-brands-are-investing-in-voice-how-to-make-it-work/ [Accessed: 17.12.2019].

Beverland, M. (2021): Brand Management - Co-creating Meaningful Brand, 2. Aufl., Los Angeles: Sage.

Bresinsky, P., Gräfe, H.-C. and Schiessel, M. (2019): Wie die Maschine uns narrt, transfer, 65(4), pp. 29-33.

Burmann, C., Halaszovich, T., Schade, M. and Piehler, R. (2018): Identitätsbasierte Markenführung: Grundlagen, Strategie, Umsetzung, Controlling, 3. Aufl, Wiesbaden: Springer Fachmedien.

CapGemini (2019): Discover the digital maturity of your marketing department!, [online] Available at: https://trim-capgemini.com (Accessed: 25.12.2019).

Charlesworth, A. (ed.) (2018): Digital Marketing: A Practical Approach, 3, New York: Routledge.
Cheq, Magna and IPG Media Lab (ed.) (2018): The Brand Safety Effect, [online] Available at: https://magnaglobal.com/wp-content/uploads/2018/10/The-Brand-Safety-Effect-CHEQ-Magna-IPG-Media-Lab-BMW-Logo-101018.pdf (Accessed: 07.01.2020).

Christie's (2018): Is artificial intelligence set to become art's next medium?, [online] Available at: https://www.christies.com/features/A-collaboration-between-two-artists-one-human-one-a-machine-9332-1.aspx (Accessed: 15.12.2019).

Clerwall, C. (2014): Enter the robot journalist: Users' perceptions of automated content, Journalism Practice, 8(5), pp. 519-531.

Cowan, B. R., Pantidi, N., Coyle, D., Morrissey, K., Clarke, P., Al-Shehri, S., Earley, D. and Bandeira, N. (2017): What Can I Help You With? Infrequent Users Experiences of Intelligent Personal Assistants. The 19th International Conference on Human-Computer Interaction with Mobile Devices and Services, Wien, Austria, September 4-7 2017.

Culotta, A. and Cutler, J. (2016): Mining Brand Perceptions from Twitter Social Networks, Marketing Science, 35(3), pp. 343-362.

Dall'Olmo Riley, F., Singh, J. and Blankson, C. (ed.) (2016): The Routledge Companion to Contemporary Brand Management, London: Routledge.

Daugherty, P. R. and Wilson, J. (2018): Human + Machine: Reimagining Work in the Age of AI, Boston, Mass: Harvard Business Review Press.

Davies, G., Rojas-Méndez, J. I., Whelan, S., Mete, M. and Loo, T. (2018): Brand personality: theory and dimensionality, Journal of Product & Brand Management, 27(2), pp. 115-127.

Duchowski, A. T. (2017): Eye Tracking Methodology, 3, London: Springer.

Ekman, P. and Friesen, W. V. (1976): Measuring facial movement. Environmental Psychology and Nonverbal Behavior, Journal of Nonverbal Behavior, 1(1), pp. 56-75.

Elgammal, A. M., Liu, B., Elhoseiny, M. and Mazzone, M. (2017): CAN: Creative Adversarial Networks Generating "Art" by Learning About Styles and Deviating from Style Norms, extended version of the paper published on the 8. International Conference on Comuptational Creativity (ICCC), Atlanta, [online] Available at: https://arxiv.org/pdf/1706.07068.pdf (Accessed: 16.12.2019).

Esch, F.-R. (ed.) (2019a): Handbuch Markenführung, vol. 1, Wiesbaden: Springer Gabler.

Esch, F.-R. (ed.) (2019b): Handbuch Markenführung, vol 2, Wiesbaden: Springer Gabler.

Esch, F.-R. and Kroeber-Riel, W. (1994): Expert systems for advertising, Munich: Vahlen.

Esch, F.-R. (2018): Strategie und Technik der Markenführung, 9th ed, Munich: Vahlen.

Facebook (2019): Who we are, [online] Available at: https://about.fb.com/ (Accessed: 20.12.2019).

Ferrucci, D., Levas, A., Bagchi, S., Gondek, D. and Mueller, E. T. (2013): Watson: Beyond Jeopardy!, Artificial Intelligence 199-200 (2013), pp. 93-105.

Gaede, W. (2002): Abweichen von der Norm, München: Wirtschaftsverlag Langen- Müller/Herbig.

Google (2021a): Google Search: "Artificial Intelligence" (12.8.2021).

Google (2021b): Google Search "Artificial Intelligence" (12.8.2021).

Google (2021c): Google Search "Human Intelligence" (12.8.2021).

Google (2019a): Google Vision AI, [online] Available at: https://cloud.google.com/vision (Accessed: 12.12.2019).

Google (2019b): Integrierte Lösungen für alle Werbetreibende, [online] Available at: https://marketingplatform.google.com/intl/de/about/ (Accessed: 19.12.2019).

Google (2019c): Spezifikationen für hochgeladene Displayanzeigen, [online] Available at: https://support.google.com/google-ads/answer/1722096?hl=de (Accessed: 20.12.2019).

Graefe, A., Haim, M., Haarmann, B. and Brosius, H.-B. (2018): Readers' perception of computer-generated news: credibility, expertise, and readability, Journalism, 19(5), pp. 595-610.

Guillén, S. S., Iacono, L. L. and Meder, C. (2018): Affective Robots: Evaluation of Automatic Emotion Recognition Approaches on a Humanoid Robot towards Emotionally Intelligent Machines, International Scholarly and Scientific Research & Innovation, 12(6), pp. 584-592.

Haenlein, M. and Kaplan, A. (2019): A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence, California Management Review, 61(4), pp. 5-14.

Hazlett, R. L. and Hazlett, S. Y. (1999): Emotional Response to Television Commercials, Journal of Advertising Research, 39(2), pp. 7-23.

Hiller, L. and Isaacson, L. (1958): Musical composition with a high-speed digital computer, Journal of Audio Engineering Society, 6, pp. 154-60.

Hippner, H., Meyer, M. and Wilde, K. B. (ed.) (1998): Computer Based Marketing: the handbook of marketing informatics, 2nd ed, Wiesbaden: Springer.

Holmqvist, K., Nyström, M., Andersson, R., Dewhurst, R., Jarodzka, H. and van de Weijer, J. (2011): Eye Tracking: A Comprehensive Guide to Methods and Measures, Oxford: University Press.

Höltgen, S. (2019): Von der Sprachphilosophie zu ELIZA, Mainzer, K. (ed.), Philosophisches Handbuch Künstliche Intelligenz, Wiesbaden: Springer Fachmedien, pp. 1-22.

Horn, W. (1990): Anwendungen von Expertensystemen, in: Gottlob, G., Frühwirt, T. and Horn, W. (ed.), Expert Systems, Vienna: Springer, 61-72.

Huang, M. H. and Rust, R. T. (2021): A strategic framework for artificial intelligence in marketing, Journal of the Academy of Marketing Science, 49, pp. 30-50.

IBM (2019a): Wissenschaftliche Grundlagen des Service, [online] Available at: https://cloud.ibm.com/docs/services/personality-insights?topic=personality-insights-science#science (12.12.2019).

IBM (2019b): Personality Insights, [online] Available at: https://www.ibm.com/watson/services/personality-insights/ (Accessed: 12.12.2019).

Juniper Research (2020): Voice Assistant Market: Player Strategies, Monetisation & Market Size 2020-2024, [online] Available at: https://www.statista.com/statistics/973815/worldwide-digital-voice-assistant-in-use/ (Accessed: 05.08.2021).

Kamps, I. and Schetter D. (ed.) (2018): Performance Marketing. Wiesbaden: Springer Fachmedien.

Kaplan, A. and Haenlein, M. (2019): Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence, Business Horizons, 62, pp. 15-25.

Keller, K.-L. and Swaminathan, V. (2020): Strategic Brand Management: Building, Measuring, and Managing Brand Equity, 5. Aufl, Harlow: Pearson.

Kilani, A., Hamida, A. B. and Hamam, H. (2019): Artificial Intelligence Review, in: Part of Advanced Methodologies and Technologies in Artificial Intelligence, Computer Simulation, and Human-Computer Interaction, pp. 23-39, [online] Available at: https://www.igi-global.com/viewtitlesample.aspx?id=213115&ptid=206309&t=Artificial%20Intelligence%20Review&isxn=9781522573685 (Accessed: 11.12.2019).

Kirste, M. and Schürholz, M. (2019): Einleitung: Entwicklungswege zur KI, Wittpahl, V. (ed.), Künstliche Intelligenz. Technologie. Anwendung. Gesellschaft, Berlin: Springer Vieweg, pp. 21-35.

Korf, R. E. (1997): Does Deep-Blue use AI?, in Morris, R. (ed.), Deep Blue Versus Kasparov: The Significance For Artificial Intelligence, Workshop Paper of the AAAI Conference, pp. 1-3.

Kübler, R. V., Colicev, A. and Pauwels, K. H. (2019): Social Media's Impact on the Consumer Mindset: When to Use Which Sentiment Extraction Tool?, in: Journal of Interactive Marketing, 50, pp. 136-155.

Küchemann, F. (2018): Das Heulen des Fortschritts, [online] Available at: https://www.faz.net/aktuell/feuilleton/debatten/der-einsatz-von-kuenstlicher-intelligenz-an-universitaeten-15745530.html (Accessed: 26.12.2019).

Kulke, L., Schacht, A. and Feyerabend, D. (2018): A Comparison of the Affectiva iMotions Facial Expression Analysis Software with EMG for Identifying Facial Expressions of Emotions (Preprint).

Kumar, V., Rajan, B., Venketesan, R. and Lecinski, J. (2019): Understanding the Role of Artificial Intelligence in Personalized Engagement Marketing, Journal California Management Review, 61(4), pp. 135-155.

Lally, A. and Fodor, P. (2011): Natural Language Processing With Prolog in the IBM Watson System, Computer Science, [online] Available at: https://www.semanticscholar.org/paper/Natural-Language-Processing-With-Prolog-in-the-IBM-Lally-Fodor/c0ddc1e420ab0b2477865b160130335aad41dcc6 (Accessed: 06.02.2020).

Lamkhede, S. and Das, S. (2019): Challenges in Sear on Streaming Services: Netflix Case Study, in: Proceedings of SIGIR19: SIGIR Symposium on IR in Practice (SIRIP) 2019 (SIGIR19), ACM, New York, USA.

Lei, J., Sala, J. and Jasra, S. (2017): Identifying correlation between facial expression and heart rate and skin conductance with iMotions biometric platform, Journal of Emerging Forensic Sciences Research, 2(2), pp. 53-83.

Lin, C, Y., Xue, N., Zhao, D., Huang, X. and Feng, Y. (2016): Natural Language Understanding and Intelligent Applications, 5th CCF Conference on Natural Language Processing and Chinese Computing, NLPCC 2016 and 24h International Conference on Computer Processing pf Oriental Languages, ICCPOL 2016 Kunming, China, December 2-6, 2016, Heidelberg: Springer Nature, 336.

Liu, B. and Zhang, L. (2012): A Survey of Opinion Mining and Sentiment Analysis, in: Aggarwal, C. C./Zhai, C. X. (ed.), Mining Text Data, Berlin: Springer Science + Business Media, pp. 415-463.

Liu, L., Dzyabura, D. and Mizik, N. (2018): Visual Listening In: Extracting Brand Image Portrayed on Social Media, 32. AAAI Conference on Artificial Intelligence, 71, pp. 71-77.

Luck, J. (2018): Großes Drama ums Echte, [online] Available at: https://www.zeit.de/2018/38/lil-miquela-instagram-influencerin-fiktion (Accessed: 15.12.2019).

McLaughlin, C. E. (2019): Talk to me, baby - Branding the Conversation. Wie sich Marken mit Persönlichkeiten ins digitale Gespräch bringen, in: Baetzgen, A. (ed.), Brand Innovation - Impulse für das Markenmanagement von morgen, Stuttgart: Schäffer-Poeschel, 153-171.

Menzel, C. and Winkler, C. (2018): Zur Diskussion der Effekte Künstlicher Intelligenz in der wirtschaftswissenschaftlichen Literatur. Diskussionspapier Nr. 8. Bundesministerium für Wirtschaft

und Energie, [online] Available at: https://www.bmwi.de/Redaktion/DE/Downloads/Diskussionspapiere/20190205-diskussionspapier-effekte-kuenstlicher-intelligenz-in-der-wirtschaftswissenschaftlichen-literatur.pdf?__blob=publicationFile&v=6 (Accessed: 11.12.2019).

MetaDesign (2019): Meta Profile, [online] Available at: https://metaprofiler.com/ (Accessed: 17.12.2019).

Miquela (2021): Instagram-Profile, [online] Available at: https://www.instagram.com/lilmiquela/?hl=de (Accessed: 13.08.2021).

Mori, M. (1970): The uncanny valley, Energy, 7(4), pp. 33-35.

Mustak, M., Salminen, J., Ple, L. and Wirtz, J. (2021): Artificial Intelligence in Marketing: Bibliometric Analysis, Topic Modeling and Research Agenda, Journal of Business Research, 124(4), pp. 389-404.

Neibecker, B. (1990): Werbewirkungsanalyse mit Expertensystemen, Heidelberg: Physica.

Netflix (2019): How Netflix's Recommendations System Works, [online] Available at: https://help.netflix.com/en/node/100639 (Accessed: 18.12.2019).

Netzer, O., Feldman, R., Goldenberg, J. and Fresko, M. (2012): Mine your own business: Market-Structure Surveillance Through Text Mining, Marketing Science Journal, 31(3), pp. 521-543.

Newborn, M. (2000): Deep Blue's contribution to AI, Annals of Mathematics and Artificial Intelligence, 28, pp. 27-30.

Newitz, A. (2016): Movie written by algorithm turns out to be hilarious and intense, [online] Available at: https://arstechnica.com/gaming/2016/06/an-ai-wrote-this-movie-and-its-strangely-moving/ (Accessed: 15.12.2019).

nextMedia Hamburg (2019): Media Innovation Report:: So denken die Deutschen über Künstliche Intelligenz, [online] Available at: https://www.nextmedia-hamburg.de/so-denken-die-deutschen-ueber-kuenstliche-intelligenzen/ (Accessed: 15.12.2019).

Nissen, V. (2017): Digital Transformation of the Consulting Industry - Introduction and Overview, in: Nissen, V. (ed.), Digital Transformation of the Consulting Industry, Basel: Springer International, pp. 1-60.

Ogilvy Italia (2017): Nutella Unica, [online] Available at: https://www.youtube.com/watch?v=RY-nK4ChLEQ (Accessed: 15.12.2019).

Osbaldo, F. (2019): Media Quality Report. H1 2019 Benchmarks, IAS Integral Ad Science (ed.), [online] Available at: https://insider.integralads.com/h1-2019-media-quality-report/ (Accessed: 07.01.2020).

Otto, K. (2019): So geht Branding bei Sprachassistenten, [online] Available at: https://www.wuv.de/digital/so_geht_branding_bei_sprachassistenten (Accessed: 17. 12.2019).

Pajkoiv, N. (2021): Algorithms and taste-making: Exposing Netflix Recommender System's operational logics, Convergence.

Phillips, E., Zhao, X., Ulman, D. and Malle, B. F. (2018): What is Human-like?: Decomposing Robots' Human-like Appearance Using the Anthropomorphic robot (ABOT) Database, iProceedings of the 2018 ACM/IEEE International Conference on Human-Robot Interaction, pp. 105-113.

Piccinini, G. (2003): Turing's Rules for the Imitation Game, in: Moor, J. H. (ed.), The Turing Test, The Elusive Standard of Artificial Intelligence, Dordrecht: Springer Science + Business Media, pp. 111-120.

Pilhar, J. (2019): Brand Automation - wie digitale Technologien das Markenmanagement verändern, in: Baetzgen, A. (ed.), Brand Innovation, Impulse für das Marken-Management von Morgen, Stuttgart: Schäffer-Poeschel, pp. 207-216.

Pinela, C. (2017): Recommender Systems - User-Based and Item-Based Collaborative Filtering, [online] Available at: https://medium.com/@cfpinela/recommender-systemss-user-based-and-item-based-collaborative-filtering-5d5f375a127f/ (Accessed: 17.12.2019).

Plass-Fleßenkämper, B. (2016): Aus Malerei wird Musik - per Algorithmus, [online] Available at: https://www.gq-magazin.de/auto-technik/articles/aus-malerei-wird-musik-algorithmus?_ga=2.113127943.2076314252.1576410426-446503158.1576410426 (Accessed: 15.12.2019).

Popp, H., Ciolacu, M. and Binder, L. (2018): Blended Learning 4.0 Prozess: Effizient und KI-unterstützt, Proceedings 17. E-Learning Tag der FH JOANNEUM, Graz, pp. 101-112.

Ramadan, Z., Farah, M.F. and El Essrawi, L. (2020): From Amazon.com to Amazon.love: How Alexa is redefining companionship and interdependence for people with special needs, Psychology & Marketing, 38, pp. 596-609.

Riberio, M. T., Singh, S. and Guestrin, C. (2016): Why Should I Trust You? - Explaining the Predictions of Any Classifier, in: Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, pp. 1135-1144.

Ricci, F., Rokach, L., Shapira, B. and Kantor, P. B. (2011): Recommender Systems Handbook. New York: Springer.

Rondinella, G. (2018): Das kommt dabei heraus, wenn eine KI einen Werbespot schreibt, [online] Available at: https://www.horizont.net/tech/auftritte-des-tages/lexus-das-kommt-dabei-heraus-wenn-eine-ki-einen-werbespot-schreibt-171191 (Accessed: 15.12.2019).

Rosenzweig, J., Nguyen, A., Zuckerman, N., Green, A., Cali, S., Hosking, T. and Gittins, E. (2018): A Guaranteed Opportunity in Programmtic Advertsing, [online] Available at: https://www.bcg.com/de-de/publications/2018/guaranteed-opportunity-programmatic-advertising.aspx (Accessed: 07.02.2020).

Samek, W., Wiegand, T. and Müller, K. R. (2017): Explainable Artificial Intelligence: Understanding, Visualizing and Interpreting Deep Learning Models, in: arXiv (preprint arXiv: arXiv:1708.08296).

Scheier, C. and Held, D. (2019): Künstliche Intelligenz in der Markenführung: Der effiziente Weg den Erfolg von Marken zu steuern, Freiburg: Haufe.

Seitz, J. (2019): Jauchen, Jammern, Machen. Voice als neuer Touchpoint, in: Markenartikel, 4, pp. 12-15.

Sousa, M. J. and Rocha, A. (2019): Skills for disruptive digital business, Journal of Business Research, 94, pp. 257-263.

Stöckli, S., Schulte-Mecklenbeck, M., Borer, S. and Samson, A. C. (2018): Facial Expression Analysis with AFFDEX and FACET, Behavior Research Methods Journal, 50(4), pp. 1446-1460.

Strubell, E., Ganesh, A. and McCallum, A. (2019): Energy and policy considerations for deep learning in NLP, in: arXiv (preprint arXiv:1906.02243).

Suarez, D. J. (2017): Salesforce Releases Fourth Annual State of Marketing Report - Marketing Embraces the AI Revolution, [online] Available at: https://www.salesforce.com/blog/2017/06/fourth-annual-state-of-marketing-report.html (Accessed: 17. 12.2019).

Teixeria, T., Wedel, M. and Pieters, R. (2012): Emotion-Induced Engagement in Internet Video Advertisements, Journal of Marketing Research, 49(2), pp. 144-159.

van de Sand, F., Frison, A., Zotz, P., Riener, A. and Holl, K. (2020): User Experience is Brand Experience: The Psychology Behind Successful Digital Products and Services. Cham: Springer.

VDZ (2018): BRAND SAFETY; TRUST AND CREDIBILITY: Studie zur Untersuchung des Forschungsfelds „Brand Safety“ aus B2B- und B2C-Perspektive, [online] Available at: https://www.vdz.de/fileadmin/vdz/upload/services/Downloads/VDZ_Brand_Safety_Studie_2018.pdf (Accessed: 28.01.2020).

Verma, S., Sharma, R., Deb, S. and Maitra, D. (2021): Artificial intelligence in marketing: Systematic review and future research direction, International Journal of Information Management Data Insights, 1(1).

VisionOne (2019): Brand Archetypes, [online] Available at: https://visionone.co.uk/research-services/consumer/brand-research/ (Accessed: 17.12.2019).

Valcic, B., Corbo, L., Silva, S. C. E. and Dabic, M. (2021): The evolving role of artificial intelligence in marketing: A review and research agenda, Journal of Business Research, 128, pp. 187-203.

Wagener, A. (ed.) (2019): Künstliche Intelligenz im Marketing - ein Crashkurs. Freiburg, München, Stuttgart: Haufe Group.

Wakabayashi, D. and Maheshwari, S. (2017): YouTube Advertiser Exodus Highlights Perils of Online Ads, [online] Available at: https://www.nytimes.com/2017/03/23/business/media/youtube-advertisers-offensive-content.html?xing_share=news (Accessed: 26.12.2019).

Wegner, J. (2016): Jetzt spricht Scholz & Friends, [online] Available at: https://www.horizont.net/agenturen/kommentare/Debatte-um-KeinGeldFuerRechts-Jetzt-spricht-Scholz--Friends-144815 (Accessed: 26.12.2019).

West, A., Clifford, J. and Atkinson, D. (2018): Alexa, build me a brand: An Investigation into the impact of Artificial Intelligence on Branding, The Business and Management Review, 9(3), pp. 321-330.

Wittpahl, V. (2019): Vorwort, in: Wittpahl, V. (ed.), Künstliche Intelligenz. Technologie. Anwendung. Gesellschaft, Berlin, Heidelberg: Springer Vieweg, pp. 7-14.

Writer, B. (ed.) (2019): Lithium-Ion Batteries- A Machine-Generated Summary of Current Research, Springer.

Xu, F., Uszkoreit, H., Du, Y., Fan W., Zhao, D. and Zhu, J. (2019): Explainable AI: A Brief Survey on History, Research Areas, Approaches and Challenges, in: Tang, J., Kann, M.-Y., Zhao, D., Li, S. and

Zan, H. (ed.): Natural Language Processing and Chinese Computing, Heidelberg: Springer Nature, pp. 563-574.

Yarbus, A. L. (1967): Eye Movements and Vision, New York: Springer.

YouGov (ed.) (2018): Künstliche Intelligenz im Auge des Verbrauchers, oO.

YouTube (2016): Lejaren Hiller Illiac Suite für Streichquartett, [online] Available at: https://www.youtube.com/watch?v=fojKZ1ymZlo (Accessed: 15.12.2019).

Yu, H. (2016): From Deep Blue to DeepMind: What AlphaGo Tells Us, Society of Actuaries, 13, pp. 42-46.

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