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The Future of Marketing: Artificial Intelligence, Virtual Reality, and Neuromarketing

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Introduction

"We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don't let yourself be lulled into inaction."

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In this often-cited quote, Microsoft founder Bill Gates encourages organisations to be more proactive and future-oriented in their strategies for technology adoption. These viewpoints are particularly relevant to marketing, as planning for future change has been acknowledged as the main challenge in both marketing research and practice, particularly in relation to new technologies (Shankar et al., 2011).

According to Stone et al. (2020), marketing has undergone several transformations over the decades and is likely to experience more phenomenal changes in the future. Consequently, the scope of the application of technologies in marketing will grow over time. Contemporary marketing research shows that the future of marketing will focus on artificial intelligence (AI), virtual reality (VR), and neuromarketing (e.g. Huang & Rust, 2021). This chapter contributes to knowledge first by reviewing literature on marketing-related AI, VR, and neuromarketing issues. Second, it provides guidance on how enhanced marketing outcomes can be achieved through the applications of these new technologies and tools. Finally, it draws on Stone et al.'s (2020) suggestion to integrate marketing literature into marketing-technology prediction.

Definitions of Key Concepts

Artificial Intelligence

Artificial intelligence (AI) is a form of intelligence displayed by machines (Wirth, 2018) using multiple technologies to enable computers to sense, comprehend, learn, and act, including procedures such as computational intelligence, natural language processing, machine learning, and knowledge representation (Awalegaonkar et al., 2019). The fact that AI is increasingly replacing and improving human thinking capability can be regarded as disruptive. Because AI can identify, merge, and analyse large, varied data types, it represents a remarkable revolution in marketing's capability to target individual customers.

Marketing tasks rely on intelligence, and AI is capable of analysing customers' buying patterns, designing advertisements to suit target customers, and setting proper pricing to maximise revenues generated from

individual customers (Marinchak et al., 2018). AI deployment in marketing has gained importance due to increased computing power, reduced computing costs, the accessibility of big data, and the spread of machine learning algorithms. There are broad applications of AI in many areas of marketing. For instance, Amazon.com's Prime Air deploys drones to automate shipping and delivery. Lexus uses IBM Watson to script its TV commercial "Driven by Intuition". Considering its applications, it is believed that AI will change the future of marketing (Eriksson et al., 2020).

Virtual Reality

According to Craig, Sherman and Will (2009, p. 11), virtual reality (VR) is a "media comprising interactive 3D computer simulations that sense the participant's position and actions, provide synthetic feedback to one or more senses, [and yield] feeling immersed in the simulation". VR represents an important marketing tool, with many applications ranging from VR-based offerings (e.g. Disney Movies VR) and promotional tools (e.g. Coca-Cola's Virtual Locker Room), to distribution channels (e.g. Wayfair IdeaSpace). According to Hollebeek et al. (2020), VR can help potential customers better assess brands, especially where the customers are remote from the offering (e.g. e-commerce) or where 2D models fall short (e.g. tourism). VR can make traditional brand communications more experiential, providing a desirable "pre-consumption experience" that can boost consumers' attitudes towards brands. In a review of the VR-marketing literature, Alcañiz et al. (2019) suggest that VR marketing is an effective tool because of its capability to deepen consumer experiences. Therefore, by complementing or substituting with other marketing tools, VR can enrich customers' experiences, thereby providing key advantages to marketers (Dobrowolski et al., 2014).

Companies are increasingly using VR marketing practices (e.g. branded VR games) to promote their business (Jung & tom Dieck, 2017). Flavián et al. (2019) further conceptualise the importance of VR in marketing by incorporating it into the consumer hierarchy framework. These authors posit that technology can enhance consumer core experiences (e.g. product appraisal), making the experiences more valuable. For example, VR

headsets allow users to interact with objects at a 360° angle in virtual space, a real-world simulation that enriches consumers' experience with the product (van Berlo et al., 2021).

Neuromarketing

Neuromarketing refers to an application of neuropsychology to market research, with the goal of studying consumers' cognitive responses to marketing stimuli (Sebastian, 2014). This psychosocial approach is increasingly shaping marketing research and practice. For example, conventional marketing tools for collecting and analysing consumer feedback are time-consuming, carry a high cost, and often yield inaccurate results (Malhotra & Dash, 2016). Compared to conventional techniques, neuromarketing can capture consumers' tacit cognitive and emotional responses to marketing stimuli, useful for the prediction of consumers' purchase decisions (Rawnaque et al., 2020).

Neuromarketing employs non-invasive brain signal recording techniques to gauge the response of a customer's brain to marketing stimuli, thus surpassing conventional survey methods (Vecchiato et al., 2011). Examples of neural recording devices commonly used in neuromarketing research are electroencephalography (EEG), functional magnetic resonance (fMRI), magnetoencephalography (MEG), positron emission tomography, transcranial magnetic stimulator, and functional near-infrared spectroscopy (fNIRS). Customers' cognitive and emotional responses (i.e. like/dislike, approach/withdrawal) can be examined by obtaining neuronal activity from the brain using these devices. Different stimuli activate associated responses in the human brain, and these responses can be tracked by observing the changes in neuronal signals (or brainwaves).

Contemporary Marketing Discourse

Artificial Intelligence

The marketing literature has delved into the general applications of AI (De Bruyn et al., 2020; Jarek & Mazurek, 2019; Ma & Sun, 2020; Wirth,

2018), the application of AI in strategic marketing decision-making (Eriksson et al., 2020; Stone et al., 2020), AI and branding (Jones, 2018; West et al., 2018), and development of a strategic framework for AI in marketing (Huang & Rust, 2021). Kiron and Schrage (2019) highlighted that the majority of the extant literature focuses on the strategic extension of AI in organisations, particularly in operational areas.

There are three main phases in the studies on AI. The first phase focuses on basic understanding of AI in marketing (e.g. Martínez-López & Casillas, 2013; Wierenga, 2010); the second phase considers the applications of AI in various marketing contexts (e.g. Rekha et al., 2016; Stone et al., 2017); the third phase addresses issues related to emerging technologies for predictive analytics, such as neural networks, big data, and machine learning (e.g. Chi-Hsien & Nagasawa, 2019; Liu, 2020). Table 12.1 offers summaries of recent studies on AI in marketing research.

Virtual Reality

Virtual reality is a useful tool for the prediction of consumer behaviour in real stores (Bigné et al., 2016; Vrechopoulos et al., 2009). Recent studies used a 3D web-based virtual supermarket to explore consumer behaviour (Waterlander et al., 2015) and high-immersive visual interfaces (based on head-mounted displays, HMDs) to examine consumer perceptions and purchasing behaviour (e.g. Bigné et al., 2018; Castellanos et al., 2018; Verhulst et al., 2017). The empirical evidence from recent VR marketing research suggests that VR marketing is largely effective at closing the gap between action and experience. For example, Tussyadiah et al. (2018) found positive effects of the use of VR marketing in a tourism context on consumers' attitudes and behavioural intentions. Comparable results were highlighted by Wang and Chen (2019), who suggest that product placements in VR videos foster interest in the products' brands and purchase intentions. In another study, Martínez-Navarro et al. (2019) showed the positive effect of VR in an e-commerce context on brand recall and purchase intention.

Table 12.2 summarises recent research on VR in marketing. These studies investigated strategies for marketing using VR games (Ho &

Table 12.1 Recent literature on AI in marketing

Authors	Focus/title	Findings	Comments/suggestions for future research
Wirth (2018)	Hello, marketing: What can artificial intelligence help you with?	It is time to embrace artificial intelligence. Marketing and data scientists can leverage a rich toolbox of predictive models and machine learning approaches.	Recent developments are calling for a more granular terminology than the two extremes of narrow artificial intelligence and full artificial intelligence.
Jones (2018)	Voice-activated change: Marketing in the age of artificial intelligence and virtual assistants	The focus for brands must be on the audience. This is something marketers ought to know, but it becomes important in the case of voice-activated assistants.	With the growth of AI and increasingly connected homes, users' decisions may be replaced with devices making decisions, providing curated answers, talking to each other, and employing machine learning to become more personalised. Marketers may find themselves marketing to these devices instead.
West et al. (2018)	"Alexa, Build me a Brand" An investigation into the impact of artificial intelligence on branding	AI can improve operational efficiency by improving the consistency with which a brand delivers its promise. Natural Language Processing can improve many elements of customer service. Machine learning enables personalised offerings, but organisations are constrained by data quality and quantity, and knowledge of the application of the technologies.	Future research should investigate the effect of AI technologies (automation, machine vision) and examine their effects on a broader range of brand elements (communications, loyalty, pricing) to establish other ways AI can be deployed to build brand value.

(continued)

Table 12.1 (continued)

Authors	Focus/title	Findings	Comments/suggestions for future research
Jarek and Mazurek (2019)	Marketing and artificial intelligence	AI is extensively introduced into the marketing domain, even though the applications are still at the operational level. AI affects all aspects of marketing mix, influencing both consumer value delivery and the marketing organisation (including the management).	There is a need for future research to examine the effect of AI on marketing, particularly the business effect.
Huang and Rust (2021)	A strategic framework for artificial intelligence in marketing	AI can be used for marketing research, strategic planning (segmentation, targeting, and positioning—STP), and actions.	N/A
Eriksson et al. (2020)	Think with me, or think for me? On the future role of artificial intelligence in marketing strategy formulation	AI can be deployed as an effective response to the external contingencies of large volumes of data and uncertain environmental conditions. It is, as well, an effective response to the external contingencies of constrained managerial cognition.	The barriers to use of AI (i.e. business culture, digital readiness) are worthy of further inquiry. It is necessary that future studies explore the contingencies of firms benefitting from deploying AI, thereby carrying out a cost-benefit analysis. Another important future consideration is a "creative-possibility perspective".

Table 12.1 (continued)

Authors	Focus/title	Findings	Comments/suggestions for future research
Stone et al. (2020)	Artificial intelligence (AI) in strategic marketing decision-making: A research agenda	There is a critical need for more research, both to pilot how marketing academics train their students and prepare them for the marketing field, and to guide marketing, information technology, and strategy decision-makers on artificial intelligence investments, deployment and exploitation.	Other areas that require more research include how to maintain innovativeness in strategic marketing decision-making and planning in an AI-driven world.
De Bruyn et al. (2020)	Artificial intelligence and marketing: pitfalls and opportunities	AI will have a profound impact on predictive tasks that can be automated and demand little explanation.	AI will fall short of its promises in many respects in marketing domains if the challenges of tacit knowledge transfer between AI models and marketing organisations are not resolved.
Ma and Sun (2020)	Machine learning and AI in marketing–connecting computing power to human insights	The coming decades will witness the proliferation of automated AI agents powered by machine learning methods in every aspect of marketing, driven by big data, technology, and competition.	It is imperative to take advantage of the rich digital information to expand the understanding of firms and consumers, to address emerging issues in the marketing field, and to create scalable and automated decision support capacities that will be vital to business managers.

Source: Authors' compilation

Table 12.2 Recent literature on VR in marketing

Authors	Focus	Findings	Comments/ suggestions for future research
Ho and Zhang (2020)	Strategies for marketing really new products to the mass market: A text mining-based case study of virtual reality games	The marketing of a class of "really new products" may focus on its uniqueness upon initial introduction. It may shift from uniqueness to the new elements of each individual product as the newness of the class of "really new products" fades over time. In addition, the marketing strategies of "really new products" may experience an exploratory process after months (or years) of their initial launch.	Future research could expand the input to incorporate VR game screenshots and trailers.
Kong et al. (2020)	VR technology in marketing from the perspective of customer experience	The most direct impact factors of VR on the operation of strategic marketing models are immersion, conception, and customer buying behaviour. Product added value and brand design are indirect impact factors. Corporate profitability is the most important factor influencing the operation of marketing models.	N/A

Table 12.2 (continued)

Authors	Focus	Findings	Comments/ suggestions for future research
van Berlo et al. (2021)	Brands in virtual reality games: Affective processes within computer-mediated consumer experiences	Virtual product appeal reinforces the influence of brands in VR games on brand attitude. Additionally, brands in VR games show emotional responses, which subsequently drive brand attitude and purchase intention.	Future research might manipulate specific attributes of an embedded virtual product (e.g. the image quality of the virtual product). It should explore whether the findings of van Berlo et al. (2021) corroborate different consumer learning situations as simulated in HMD VR.
Subawa et al. (2021)	The practices of virtual reality marketing in the tourism sector, a case study of Bali, Indonesia	There is hegemony in the practice of VR marketing to tourists and potential consumers, using major technology. The marketers practise the hegemony of VR marketing on tourists and potential customers. Tourism capitalism, as a chain link in the tourism industry, can be integrated into marketing through VR.	Subsequent studies are encouraged to perform a review of VR marketing in various regions so as to obtain a robust comparison, and there is a need to emphasise the readiness of government regulations that adopt VR marketing.
Zheng (2021)	Application of virtual reality technology in marketing training	The deployment of proper algorithms can foster the application of virtual reality technology in marketing training.	N/A

Table 12.2 (continued)

Authors	Focus	Findings	Comments/suggestions for future research
Sung et al. (2021)	The effectiveness of a marketing virtual reality learning simulation: A quantitative survey with psychophysiological measures	VR leads to a higher experience of immersion, learning attitude, and enjoyment. Further, immersion was found to mediate the positive effects of VR simulation on learning attitude, but not on enjoyment. Remarkably, students in the video performed better on the knowledge-based test than those in the VR.	The current prototype of VR simulations could be used as a supplementary resource to improve the learning attitude and enjoyment, but not as the major teaching material to foster knowledge-based performance in marketing.

Source: Authors' compilation

Zhang, 2020;), algorithms of VR technology in marketing training (van Berlo et al., 2021; Zheng, 2021), VR marketing from the perspective of the customer (Hollebeek et al., 2020; Kong et al., 2020), VR marketing in the tourism sector (Subawa et al., 2021), and marketing VR learning simulation (Sung et al., 2021). In the early 2000s, research into VR explored virtual worlds (which allowed navigation in virtual stores). Studies analysed the role of *Second Life*, launched in 2003, as a tool for virtual product sales (Jin & Bolebruch, 2009) and marketing research (Kaplan & Haenlein, 2009).

Neuromarketing

As technologies continue to advance, marketing stimuli are becoming more oriented towards TV commercials or images of the product (rather than the real product) (Boccia et al., 2019; Çakir et al., 2018; Shen et al., 2018). Three-dimensional images of products, especially e-commerce

products, have contributed to virtual product purchase decision-making and have gained interest in the neuromarketing discourse (Çakar et al., 2017; Chew et al., 2015). Aside from marketing-focused stimuli, some studies (e.g. Ariely & Berns, 2010; Redcay & Schilbach, 2019; Shen & Morris, 2016) focused on social advertisements using neuroimaging and neural signal decoding techniques to examine and predict the success of their message. Analysis of consumers' emotional responses, an emphasis in recent neuromarketing research, utilises Frontal Alpha Asymmetry theory for right and left frontal channel as well as alpha, beta, and theta bands (to identify the cognitive and emotional response of the consumers).

Table 12.3 summarises recent research into the technological advancements and opportunities in neuromarketing (Dapkevičius & Melnikas, 2009; Rawnaque et al., 2020; Roth, 2014), neuromarketing in branding and advertisement (Hafez, 2019), neuromarketing applied to packaging (Juarez et al., 2020), neuromarketing in subliminal advertising (Hsu & Chen, 2020), and the decision to adopt neuromarketing techniques (Nilashi et al., 2020).

In the last half-decade of consumer neuroscience research, the use of EEG devices has become more prevalent than fMRI scanners. Whilst EEG is particularly employed in TV ad evaluation (where high resolution is needed to explore the dynamic effects of commercials), fMRI is used in the display of product images to explore consumers' purchase decisions. In fMRI-based neuromarketing research, the merit of using product images as marketing stimuli is that fMRI can identify the activated brain region the moment a consumer experiences a marketing stimulus. fNIRS has the advantage of mobility and is used in consumer reaction examination and purchase behaviour correlation (Çakir et al., 2018; Krampe et al., 2018). fNIRS is claimed to have an accuracy of over 70% and a reliability scale of 0.7 out of 1 (Çakir et al., 2018). fNIRS is therefore believed to have great potential in neural recording for future experiments in neuromarketing (Rawnaque et al., 2020).

Most of the EEG devices used in academic research are Emotiv Epoc, Emotive Epoc+, BrainAmp, eego Sports and NeuroSky MindWave. Over the last few years, fMRI-based neuromarketing research has employed 3-Tesla fMRI scanner Magnetom Trio, SIEMENS, and Siemens Verio scanner for experiments (Hubert et al., 2018). In most studies, signal pre-processing was

Table 12.3 Recent literature on neuromarketing

Authors	Focus	Findings	Comments/suggestions for future research
Dapkevičius and Melnikas (2009)	Influence of price and quality to customer satisfaction: neuromarketing approach	Neuromarketing is increasingly used and has future prospects in marketing research to enhance marketing strategies, ad campaigns, and brand building.	Some scholars believe that neuromarketing could lead to invasion of privacy and influence customers' purchase choices. Nevertheless, many companies will still utilise it in their marketing campaigns.
Hafez (2019)	Neuromarketing: a new avatar in branding and advertisement	If a stimuli-related brand or advertisement triggers the hippocampus, dorsolateral prefrontal cortex, and midbrain, customers will definitely purchase the brand. Ads should include deep emotional context so as to activate the emotional brain, which, in turn, can lead to a purchase decision.	Sometimes consumers cannot describe their true feelings and emotions for a particular brand or ad, which can be explored by neuromarketing.
Juarez et al. (2020)	Neuromarketing Applied to Educational Toy Packaging	The motivations in the process of buying educational toys are the graphic details of the packaging. Further, there is a significant social component when the product is bought as a gift for a third party.	It is considered necessary to examine other types of educational toys, in order for the results to be generalisable.

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Table 12.3 (continued)

Authors	Focus	Findings	Comments/suggestions for future research
Hsu and Chen (2020)	Neuromarketing, subliminal advertising, and hotel selection: An EEG study	Subliminal advertising significantly influences consumers' selection of hotels. An emoji smiling face (as a subliminal message) affects consumers' hotel choice. A consumer's theta band significantly increases while watching hotel videos with subliminal messages. A consumer's beta brainwave significantly decreases when videos are viewed with a smiling face emoji (as subliminal stimulus in the hotel video).	Future research utilising EEG on event-related potential (in the field of tourism and hospitality) can gain insights into the consumer's mind right from the moment they push the buy-button in their brain, as 80% of buying behaviours are determined on a subconscious or unconscious level.
Nilashi et al. (2020)	Decision to adopt neuromarketing techniques for sustainable product marketing: a fuzzy decision-making approach	The cost, usefulness, accuracy, time-saving, bias, deep probing of memory, quality of information, and emotions are neuromarketing advantages that significantly influence its adoption. Accuracy and bias are two factors that significantly influence green product suppliers in using neuromarketing advertising and branding.	Future studies should explore the relation between the techniques (i.e. fMRI, EEG, and MEG), neuromarketing factors, and neuromarketing contributions in the use of neuromarketing in green product marketing.

Table 12.3 (continued)

Authors	Focus	Findings	Comments/suggestions for future research
Rawnaque et al. (2020)	Technological advancements and opportunities in Neuromarketing: a systematic review	Consumer goods are the prevalent marketing stimuli employed in both product and promotion forms in the literature. The trend in consumer emotion recognition-based experiments is to analyse frontal and prefrontal alpha band signals. EEG usage is favoured by researchers over fMRI in video advertisement-based neuromarketing experiments (this is perhaps attributable to its low cost and high time-resolution). Found in most of the studies are physiological response measuring techniques (e.g. eye tracking, heart rate monitoring), independent component analysis (e.g. artefact removal from neural signal), and consumer response prediction and classification (e.g. Artificial Neural Network, Support Vector Machine, and Linear Discriminant Analysis).	Among the brain signal recording devices, EEG is increasingly more popular in neuromarketing experiments (especially with television commercials analysis because of its high temporal resolution). However, EEG devices possess diverse sampling rates, leading to a limit for the highest analysable frequency. Future research should investigate this.

Source: Authors' compilation

performed via MATLAB and EEGLAB. A number of research experiments utilised AI algorithms for prediction and classification.

Discussion and Implications for Marketing Managers

Artificial Intelligence

The benefits of AI application to marketing managers' strategic decision-making in emerging markets are expected to include the following (Stone et al., 2020):

- Accelerated decision-making, particularly in the face of availability of new data or emergence of competitive threats, enabling companies to seize the benefits of stronger market positions ahead
- Detection of missing data
- Improved rationality, especially in the form of removal (or reduction) of cognitive bias by decision-makers
- A common basis for decision-making
- Learning from experience
- Improved quality management of marketing projects

The growth of AI applications in marketing can be said to be synchronous with the rapid advance of marketing technology, be it front-line marketing operations (e.g. contact centres) or the management of marketing resources. This development helps in the application and support of AI in marketing as it automates other aspects of marketing and generates usable data (Stone et al., 2020). The implication is that AI deployment can be integrated into various applications by taking data feeds automatically and providing feedback to those applications.

Early thinking on business-to-business marketing arose from companies who kept contact with customers via sales forces and then contact centres. However, the data richness of the current consumer market has led to marketing automation focused on consumer markets (Stone et al.,

2020). A larger part of business-to-business marketing is also becoming widely digitalised given its similarity to consumer marketing (especially where it entails marketing to small businesses). The implication is that advanced content management systems can be deployed to target content to suitable prospects and customers; then, the download and engagement of the content is tracked. By so doing, suppliers can prioritise customers who have shown interest in their service.

AI is driven by the availability of data. For example, giant web retailers (e.g. Amazon, eBay) and advertising platforms (e.g. Bing ads, YouTube) generate rich data regarding product and service purchasing. In contemporary markets, the larger percentage of consumer (and government) expenditure is on services. Depending on the degree of digitalisation, services yield richer data flows regarding consumer behaviour: "usage, not just purchase, can be or is tracked" (Stone et al., 2020, p. 5). Data richness is expanding (e.g. some motor insurance policies feature tracking devices which measure frequency and mode of usage), and marketers must take advantage of the opportunities.

In the future, it is expected that AI will be used in strategic decision-making concerning the markets to target, the type of products to market, the channels of communication and distribution to utilise, and the form of pricing and competitive positioning. According to Stone et al. (2020), the current focus is not primarily on the replacement of human decision-making in strategic decisions, but on the creation of higher-quality decision-making mechanisms, using AI, to more quickly provide marketers with more comprehensive information and options.

AI will fall short of its promises in many respects in marketing domains if the challenges of tacit knowledge transfer between AI models and marketing organisations are not resolved (De Bruyn et al., 2020). With the growth of AI and increasingly internet-connected homes, user decisions may be replaced by devices that employ machine learning for personalisation and curated answers. As a result, marketers may find themselves marketing to these devices instead of the users (Jones, 2018). It is therefore imperative to take advantage of the rich digital information to expand the understanding of firms and consumers, address emerging issues in the marketing field, and create scalable and automated decision support capacities vital to business managers (Ma & Sun, 2020).

Virtual Reality

One of the most important advantages of VR is that it can develop "consumer-product and consumer-context interactions that are not possible in the real world" (Alcañiz et al., 2019, p. 5). Virtual reality can be a perfect platform for experiential marketing (Loureiro et al., 2019), given the related technology that enhances consumer experiences (Jung et al., 2016). Managers, especially in emerging markets, should set up virtual flagship stores for promotion purposes. VR provides richer communication between the consumer and the product when compared to traditional advertising. Since VR enhances customer experiences from evaluation to the actual purchase, companies can obtain valuable insights from their actions. The virtual world is more interactive than traditional marketing communication tools and inspires customer engagement with the brand and the company. For example, SMEs in emerging markets can take advantage of VR by using virtual magazines as an alternative to the paper press.

In digital marketing, VR is identified as a critical digital technology that will lead to novel marketing prospects. In the future, the use of interactive immersive 3D virtual stores will become more popular. Two purchase channels will coexist: first, virtual stores where consumers can interact virtually with products and, second, physical stores where consumers can interact with real products (Alcañiz et al., 2019). The two complementary channels will shore up the new concept of omnichannel retailing (Verhoef et al., 2015). For example, tourism organisations can be more active in virtual worlds through the utilisation of 3D cities, hotels simulations to the real world's destinations.

Neuromarketing

Sometimes consumers cannot describe their true feelings about a particular brand or advert, but those emotions can be explored by neuromarketing (Hafez, 2019). Neuromarketing uses physiological signals (i.e. heart rate, eye tracking, and skin conductance measurements) to garner insights into audiences' physiological responses to stimuli. These neurophysiological signals can provide accurate portrayals of consumers' preferences

(and likes/dislikes) using machine learning algorithms and advanced spectral analysis (Kroupi et al., 2014). Marketing managers, especially in emerging markets, can use neuromarketing to capture consumers' tacit cognitive and emotional responses to marketing stimuli and thus predict consumers' purchase decisions.

Some scholars argue that neuromarketing could lead to invasion of privacy and confuse customers' purchase choices. Nevertheless, many companies in emerging markets can still utilise it in their marketing campaigns (Dapkevičius & Melnikas, 2009) to measure and analyse the meanings of brainwaves using machine learning algorithms as well as signal and image processing techniques. The implication is that the buying behaviour can be detected, analysed, and predicted in marketing with the aid of brain–computer interface technologies that explore consumers' mental states (i.e. engagement, excitement, withdrawal) while experiencing the marketing stimuli (Izhikevich, 2003).

Direction for Future Research in Marketing Communications

Artificial Intelligence: Research into the deployment of AI in marketing has four main themes: (1) technical AI algorithms for the resolution of particular marketing problems (Capatina et al., 2020; Mogaji et al., 2020); (2) customers' reactions to AI (Gursoy et al., 2019; Xu et al., 2020); (3) effects of AI on society (Agrawal et al., 2019; Bag et al., 2021); and (4) managerial and strategic issues associated with AI (Eriksson et al., 2020; Huang & Rust, 2021). The fourth theme—managerial and strategic issues associated with AI—lacks a robust academic basis, even though some recent studies endeavour to address strategic marketing issues. Some examples include the deployment of machine learning for the prediction of mobile marketing personalisation (Tong et al., 2020) and AI for personalised customer engagement (Eriksson et al., 2020; Kumar et al., 2019; Overgoor et al., 2019).

In addition, recent research calls for more terminologies other than the two extremes of narrow artificial intelligence and full artificial

intelligence (Wirth, 2018). Other areas that need further investigation include how to maintain innovativeness in strategic marketing decision-making and planning in an AI-driven world (Stone et al., 2020). Future research should investigate the effect of other AI technologies (e.g. automation, machine vision) and examine their effects on a broader range of brand elements (e.g. communications, loyalty, pricing) to establish other ways AI can be deployed to build brand value (West et al., 2018). The barriers to the use of AI (i.e. business culture, digital readiness) are worthy of further inquiry. Also, future research can explore contingencies for firms to benefit from using AI, and if its cost and required efforts are worth the advantages.

Virtual Reality: The literature regarding the use of VR in marketing is quite fragmented: "Perhaps this is due, in part, to the fact that it is a multidisciplinary field combining several research areas, such as social and technological sciences, with profound methodological differences" (Alcañiz et al., 2019, p. 11). Thus, it is vital to define a rigorous methodological framework that allows the classification of research activities in the field. In addition, most of the studies to date lack a certain level of methodological rigour in either their characterisation of VR technologies or the techniques used to characterise the consumer experience. This limits the generalisation of results in the literature.

The capacity of VR to produce new virtual realities will enable controlled laboratory experiments to study the factors that influence the acceptability of new products and the influence of the various attributes (e.g. age, gender, education, and location) of consumers on their purchase decisions. The current prototype of VR simulations could be used as a supplementary resource to improve learning attitudes and enjoyment, but not as the major teaching material to foster knowledge-based performance in marketing (Sung et al., 2021). Future research could expand the input to incorporate VR game screenshots and trailers (Ho & Zhang, 2020) or ways to manipulate specific attributes of an embedded virtual product (e.g. the image quality of the virtual product). Scholars should explore whether the findings of van Berlo et al. (2021) corroborate different consumer learning situations as simulated in HMD VR. Moreover, subsequent studies are encouraged to review VR marketing in various regions to obtain a robust comparison, and research is

needed into the status of government regulations related to VR marketing (Subawa et al., 2021).

Neuromarketing: Research into neuromarketing implications involving product assessment and product purchase decision-making uses functional MRI to identify the activated region in the brain to predict interest in a product. To diagnose consumer engagement with a product, it will be worthwhile to employ EEG devices with high temporal resolution. While neuromarketing experiments using EEG devices of 32 channels and 14 channels have topped the research performance, data availability should be kept in mind in the selection of an EEG device. According to Rawnaque et al. (2020, p. 16), future research should consider the availability of "bilateral EEG electrodes if they would like to utilise frontal alpha asymmetry theory. Accompanying EEG, eye tracking has also shown high performance in attention and arousal locating". Eye trackers, galvanic skin response devices, and heart rate monitors can be used together with brain signals to confirm the experimental findings.

Future research using EEG on event-related potential (in the field of tourism and hospitality) should gain insights into the consumer's mind right at the moment they push the mental buy-button, as 80% of buying behaviours are determined on a subconscious level (Hsu & Chen, 2020). More studies can advance knowledge by exploring the relation between the techniques (i.e. fMRI, EEG, and MEG), neuromarketing factors, and neuromarketing contributions in areas such as green product marketing (Nilashi et al., 2020). For instance, EEG is increasingly becoming more popular among brain signal recording devices in neuromarketing experiments, particularly television commercials analysis, due to its high temporal resolution (Rawnaque et al., 2020). However, Rawnaque et al. suggest that as EEG devices possess diverse sampling rates, which can cause a limitation for the highest analysable frequency, this should be further investigated (Rawnaque et al., 2020). In addition, in-depth elaboration of a code of ethics for neuromarketing research is considered essential since this represents the main criticism of neuromarketing (Roth, 2014). Finally, studies can propose how firms in emerging markets can respond to the future realities of marketing communications by leveraging contemporary tools of artificial intelligence, virtual reality, and neuromarketing.

Conclusion

The chapter concludes that there are emerging trends in marketing communications that organisations must be aware of, and they must put in place strategic plans to take advantage of them. Several organisations are adopting artificial intelligence, virtual reality, and neuromarketing to make informed marketing decisions that will enhance the understanding of consumers' needs and behaviour and achieve competitive advantage. Organisations seeking market share in the emerging markets must not ignore the contemporary issues, future trends and technology-driven innovations in marketing communications.

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