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Exploring the Effect of Deepfake-based Advertising on Consumers' Attitudes and Behaviors

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A deepfake is a highly sophisticated manipulation produced by artificial intelligence (AI). The rapid advancement in AI technologies, particularly machine learning (ML) and deep neural networks (DNNs), make highly realistic fake content generated by deepfake technology increasingly difficult for human eyes to differentiate. As a form of efficient disinformation, deepfakes can be misleading and cause problems in many fields. However, if used properly, deepfakes have the potential to create major business opportunities. Because manipulation has been widely adopted in advertising, deepfakes can be a huge game-changer for advertising by using synthetic manipulation. This study examines the effects of deepfake-based advertising on consumers' attitudes and behaviors and further compares the effects with those of traditional advertising on consumers' attitudes and behaviors. The results of this study not only guide advertisers to adopt deepfake-based advertising properly to achieve positive affection on consumers' attitudes toward their brands and companies, but they also shed light on future research on deepfake-based advertising.

I. Introduction

Artificial intelligence (AI) is a complex technology with broad applications across multiple fields. Deepfakes are a highly sophisticated form of deception in the form of digitally manipulated and fabricated videos, images, and sound clips produced by AI (Chesney and Citron 2019; Wardle and Derakhshan 2017; Westerlund 2019). It can automatically create content that depicts an unreal, albeit convincing, artificial version of reality (Campbell et al. 2022). The term “deepfake” was coined as a portmanteau of the terms “deep learning” and “fake” (Mustak et al. 2023). Deepfakes began gaining recognition in 2017 when a Reddit user created and shared a series of computer-generated videos in which the faces of famous actresses were swapped onto pornographic content (Kietzmann, Mills, and Plangger 2021; Masood et al. 2023). An audience can be misled by a deepfake because it shows people saying or doing things that they have never said or done (Karpinska-Krakowiak and Eisend 2024).

Deepfakes rely on an auto-encoding and decoding process. Encoding requires training in which an encoder understands, encodes, and compresses key characteristics of a source. In the decoding process, a decoder decodes the compressed version and creates a fake subject. The training requires a huge amount of source materials so that the encoder can learn about the subjects' main features. Once the encoder truly understands how the subject works, the decoder can generate gestures and expressions of the subject (Kietzmann, Mills, and Plangger 2021).

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Popular manipulations generated by deepfakes fall into four categories: (1) Face-swap/identity swap, which uses a neural network to take the facial movements of a person in an original video and maps a target person's face on top, so the target person looks like he/she says or does the things that the original person says or does; (2) Face reenactment/expression swap, which transfers the facial gestures and eye and head movements of a source actor to a target video; (3) Lip-synching/voice-swap, which synthesizes the mouth region in the target video to a specific audio input, making the target appear to be speaking (Mustak et al. 2023); and (4) Full body reenactment/action swap, which transfers the body movements of a source actor to a target video (Chan et al. 2019).

With increased resolution and quality of image sensors, the availability of more data, and rapid advancement in AI technologies, particularly machine learning (ML) and deep neural networks (DNNs), the artificial and fake versions of reality generated by deepfakes are having greater fidelity and believability, becoming more and more convincing (Diakopoulos and Johnson 2021). It is getting increasingly difficult for an ordinary person to distinguish fact from highly realistic fake content. We used to take it for granted: "Seeing is believing." We tend to believe what we see with our own eyes and hear with our own ears (Granot et al. 2018).

Therefore, deepfakes can be a form of efficient disinformation (Dobber et al. 2021). It has been used to extort, humiliate, harass, and blackmail victims (Harris 2021). So far, the most prominent use of deepfakes is for the creation of pornography which is then used to target women. In addition, a deepfake has the potential to destabilize news reporting (Diakopoulos and Johnson 2021). It contributes to the broader problem of fake news by technically enabling both the more widespread fabrication or manipulation of media that may be deliberately used for disinformation purposes (Tandoc, Lim, and Ling 2020; Wardle and Derakhshan 2017) and the introduction of uncertainty which can affect trust in news (Vaccari and Chadwick 2020). Moreover, deepfakes have the potential to increase uncertainty in the marketplace and mislead consumers, resulting in their mistrust of businesses and psychological discomfort (Botha and Pieterse 2020; Giansiracusa 2021; Zakrzewski 2019). As a result, consumers' purchasing intentions might be eroded (Mustak et al. 2023).

However, every coin has two sides. Deepfakes possess a dark side and a light one, having a negative and positive impact on consumers and businesses. If used properly, deepfakes can have potential benefits for edutainment, therapy and mental health, and film production (Parialò 2022). Particularly, it can create major business opportunities for content creation and engagement (Etienne 2021; Farish 2020; Kietzmann et al. 2020). For example, businesses can create promotional campaigns without casting any human model or paying for a photoshoot (Whittaker et al. 2020). Deceased celebrities can be revived to promote contemporary products with a small budget (D'Rozario 2016). Multinational companies can have different versions of the same advertisement from only one take (Parialò 2022).

By now, some studies have explored the effects of deepfakes on people's political attitudes (Dobber et al. 2021). In a world already preoccupied with discussions around fake news, decaying trust, and questionable authenticity (Nyilasy 2019), how will consumers' attitudes be affected by deepfake-based advertising? Does deepfake-based advertising affect consumers' attitudes and behaviors? If yes, is there any difference between the effects on consumers' attitudes and behaviors generated by deepfake-based advertising and traditional advertising? The answers are unknown. Accordingly, this study examines the effects of deepfake-based advertising on consumers' attitudes and behaviors and further compares the effects with those of traditional advertising on consumers' attitudes and behaviors. The results of this study not only guide advertisers to adopt deepfake-

based advertising properly to achieve positive affection on consumers' attitudes toward their brands and companies, but they also shed light on future research on deepfake-based advertising.

II. Literature review

Advertising is a form of marketing communication that delivers information about a product or service to consumers, aiming to promote consumers' positive perceptions which may lead to attitudinal and/or behavioral changes (Ko, Cho, and Roberts 2005). Manipulation is common in advertising and has been experienced across three generations so far, namely analog manipulation, digital manipulation, and synthetic manipulation (Campbell, Sands, and Kietzmann 2022). Analog manipulation targets traditional media, relying on human effort through the use of cameras, make-up, lenses, and lights, as well as physical editing. Digital manipulation targets both traditional and digital media with the help of computer software, such as Photoshop. Synthetic manipulation uses AI and machine learning techniques to generate realistic fake content for online media. As a type of synthetic manipulation, deepfakes can be a huge game-changer for digital communication and advertising because they have the potential to create tremendous risks and opportunities (Kietzmann, Mills, and Plangger 2021; Parialò 2022). Deepfakes might increase uncertainty in the marketplace and mislead consumers, resulting in their mistrust of businesses as well as psychological discomfort (Botha and Pieterse 2020; Giansiracusa 2021); however, they also have the potential to change advertising, providing limitless opportunities (Kietzmann, Mills, and Plangger 2021).

First, deepfake-based advertising can create major business opportunities for content creation and engagement (Etienne 2021; Farish 2020; Kietzmann et al. 2020), because some deepfakes are interesting, engaging, and memorable to most people (Vosoughi, Roy, and Aral 2018). For example, a deepfake can be used to transform the facial visual effects in commercials to re-create an appearance for celebrities that have passed away (D'Rozario 2016; Xu et al. 2022).

Second, deepfakes can put highly creative ideas into action at a low cost. For example, deepfakes can help firms design and execute appealing marketing campaigns at a low cost by replacing and/or augmenting human roles in marketing communications (Farish 2020; Zakrzewski 2019). Models do not need to physically attend a photo or film shoot. Firms can create artificial human-like models instead of incorporating real humans (Dwivedi et al. 2021). In this way, firms save costs related to transportation, hospitality, and acting services (Whittaker, Kietzmann, Kietzmann, and Dabirian 2020). In terms of post-production and reshoots, deepfakes allow firms to replace lines without having to reshoot the whole scene. A small team can make minor changes with a computer in a fraction of the time (Parialò 2022).

Third, deepfakes can help firms overcome language barriers by dubbing videos in different languages and artificially matching lip movements and facial expressions accordingly (Diakopoulos and Johnson 2021; Kietzmann et al. 2020). In this way, firms can have different versions of the same advertisement using a single take. For example, a brand spokesperson or character can speak directly to audiences using tailored messages (Mustak et al. 2023). Additionally, advertising can be personalized to reflect individual consumer preferences or goals.

III. Research model

Consumers' responses to advertising have been studied for a very long time. There is a large body of literature focusing on consumers' attitudes toward advertising. Some studies find that consumers generally have negative attitudes toward advertising (Zanot 1981, 1984). Other studies find that advertising can generate positive consumer attitudes (Schlosser, Shavitt, and Kanfer 1999; Tsang, Ho, and Liang 2004). Meanwhile, the relationships between consumers' attitudes, intentions, and behaviors have been studied and confirmed in numerous studies as well. Some studies find that there is a direct relationship between consumers' attitudes and their behaviors (Tsang, Ho, and Liang 2004). However, given the difference between traditional advertising and deepfake-based advertising, it remains unclear whether deepfake-based advertising affects consumers' attitudes and behaviors in the same way traditional advertising does.

An advertisement's four major attributes, entertainment, informativeness, irritation, and credibility, were widely adopted to measure consumers' attitudes toward advertising (Ducoffe 1996; Schlosser, Shavitt, and Kanfer 1999). Ducoffe (1996) notes that consumer attitude toward advertising is influenced by the outcome advertising value, which consists of the entertainment and informativeness of an advertisement as well as the irritation it causes. Tsang, Ho, and Liang (2004) further note that the credibility of advertising affects the way consumers evaluate them.

Attitude, intention, and behavior are major constructs in the theory of reasoned action (TRA) and the technology acceptance model (TAM). TAM has been applied in the field of information systems to predict users' adoption of new technologies. Attitude and intention, together with perceived usefulness, perceived ease of use, and actual use, are the five constructs in this model (Davis 1989; Davis, Bagozzi, and Warshaw 1989). This study extracts attitude and intention from TAM and integrates them with outcome advertising value in the research model. Although consumers' attitude toward an advertisement and their attitude toward the advertised brand have been examined by previous studies, their attitude toward the advertised company has been overlooked. They might be affected by consumers' perceived outcome advertising value, playing a role in the relationship between consumers' attitude toward an advertisement and their purchase intention, or affect consumers' purchase intention directly. Taking all these factors into consideration, this study develops the following research model.

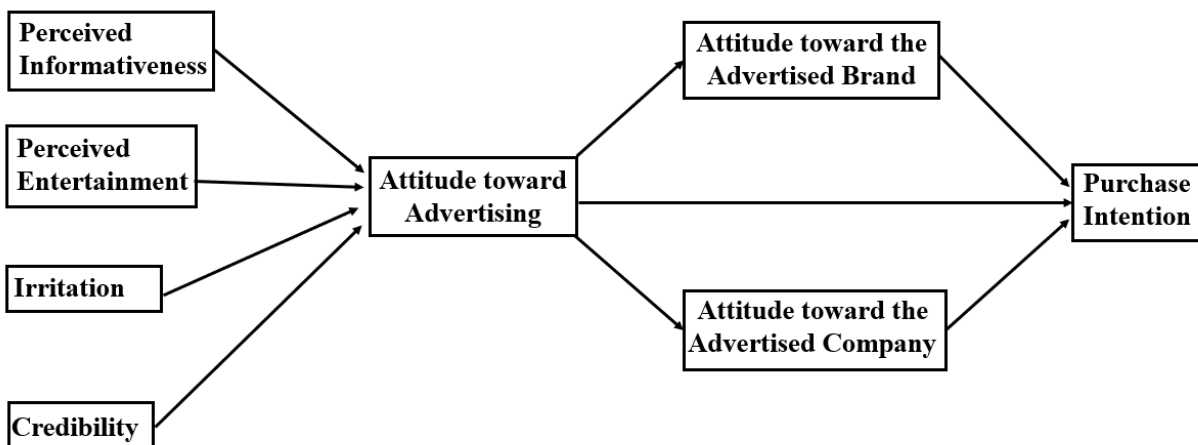


Figure 1: The research model.

IV. Hypotheses development

Providing information is one of the most fundamental features of advertising. Informativeness is the ability of advertising to satisfy consumers by providing information about a product or service (Ducoffe 1996). Perceived informativeness is found to directly affect consumers' attitude toward advertising and their purchase intention (Chen and Hitt 2002; Chen and Wells 1999; Ducoffe and Curlo 2000; Schlosser, Shavitt, and Kanfer 1999).

Entertainment is the ability of an advertisement to satisfy consumers' aesthetic and emotional needs (Ducoffe 1996). Entertainment is found to be able to attract consumers' attention and further affect their attitudes (Mitchell and Olson 1981; Papacharissi and Rubin 2000). It is a significant element in the formation of a positive attitude toward advertising among consumers (Kim, Haley, and Koo 2009). An entertaining advertisement could allow consumers to form a positive attitude toward the advertisement itself as well as the advertised brand (Mitchell and Olson 1981; Papacharissi and Rubin 2000).

Irritation is the negative, anxious, and unsatisfactory feelings consumers experience when they receive stimulation from advertising. It consists of negative or discomforting factors, such as confusion, offense, or fear (Ducoffe 1996). When irritation occurs, consumers have a negative attitude toward advertising (Taylor, Lewin, and Strutton 2011).

Attitude is an important concept in research on marketing and information systems. Consumers' attitude toward advertising includes their attitude toward the advertisement itself, the advertised brand, and the advertised company.

Consumers' attitude toward an advertisement is their internal evaluation of this advertisement. They tend to react favorably or unfavorably to the stimulation provided by a specific advertisement exposure condition (MacKenzie, Lutz, and Belch 1986). In general, it has long been found to be negative.

Consumers' attitude toward an advertised brand is their overall positive or negative evaluation of a brand (Aaker 1991). When consumers have a positive attitude toward a brand, they tend to choose a specific brand-named product on a continued or habitual basis (Aaker 1991). The positive relationship between consumers' attitude toward an advertisement and their attitude toward the advertised brand has been empirically confirmed (Edell and Burke 1987; MacKenzie and Lutz 1989). For instance, Spears and Singh (2004) found that consumers' attitude toward a brand was significantly influenced by their attitude toward the advertising associated with that brand.

Consumers' attitude toward an advertised company represents their overall evaluation of the company. It can be positive or negative, but it has not been studied together with consumers' attitude toward an advertisement and their attitude toward the advertised brand by the research of consumers' attitudes toward advertising.

Intention is distinct from attitude. Attitude is a summary evaluation, whereas intention is consumers' motivation to carry out a behavior (Eagly and Chaiken 1993). Purchase intention is consumers' conscious plan to make an effort to purchase a product or service (Spears and Singh 2004). Customers' behavioral intention involves their subjective probability of engaging in certain behaviors in the future (Ajzen and Fishbein 1980). Thus, their attitudes toward advertising, the advertised brand, and the advertised company are significant as critical predictors for understanding their behavior (Chu 2018). When consumers hold strongly favorable attitudes toward a brand/company, they are more likely to distinguish and purchase that brand over competitors (Aaker 1996).

Deepfake-based advertising represents a new form of advertising. Can the relationships between an advertisement's four major attributes and consumers' attitudes toward advertising, the advertised brand and company, as well as their purchase intention found by previous research be applied to deepfake-based advertising? To find the answer, this study presents the following hypotheses:

- Hypothesis 1:** Perceived informativeness of deepfake-based advertising positively affects consumers' attitudes toward advertising, the advertised brand and company, and their purchase intention.
- Hypothesis 2:** Perceived entertainment of deepfake-based advertising positively affects consumers' attitudes toward advertising, the advertised brand and company, and their purchase intention.
- Hypothesis 3:** Irritation of deepfake-based advertising negatively affects consumers' attitudes toward advertising, the advertised brand and company, and their purchase intention.
- Hypothesis 4:** Credibility of deepfake-based advertising positively affects consumers' attitudes toward advertising, the advertised brand and company, and their purchase intention.
- Hypothesis 5:** Deepfake-based advertising and traditional advertising generate the same relationships between an advertisement's four major attributes and consumers' attitudes toward advertising, the advertised brand and company, as well as their purchase intention.

V. Research methodology

This study conducts a survey to test the hypotheses. A questionnaire is designed to examine participants' attitudes and purchase intentions. Measurements in the questionnaire are developed by investigating the existing literature. In the survey, participants watch a traditional video advertisement of one brand and complete a questionnaire. Next, they watch a deepfake-based advertisement for the same brand and complete the questionnaire again. This procedure is repeated for the other brand. Structured equation modeling will be applied to analyze the relationships between an advertisement's four major attributes and consumers' attitudes toward advertising, the advertised brand and company, as well as their purchase intention for traditional advertising and deepfake-based advertising. Additionally, analysis of variance (ANOVA) will be conducted to compare the results generated by traditional advertising and deepfake-based advertising.

In Doritos' 2020 Super Bowl advertisement, the Magic Dance function of Sway, an AI-powered app, creates full-body deepfakes based on their commercial showing a dance battle between Lil Nas X and Sam Elliot over Cool Ranch tortilla chips. Users film themselves striking a collection of dance poses. The app then transposes the video over the body of a professional dancer, and the result shows the user appearing to dance perfectly to the choreography. Users can share their professional dance moves via social media, personalize online experiences, and enhance customer engagement.

VI. Discussions

The results of this study will guide advertisers to adopt deepfake-based advertising properly and achieve positive affection on consumers' attitudes toward their brands and companies. In addition, this pioneer study will shed light on future research on deepfake-based advertising.

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