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Virtual idol marketing: Benefits, risks, and an integrated framework of the emerging marketing field

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ABSTRACT

The marketing practice involved with virtual idols became popular, leading to the emergence of virtual idol marketing. However, there is a lack of scientific understanding of this emerging marketing field. To promote a fundamental understanding of virtual idol marketing, this study clarifies the conceptual boundary of virtual idols and provides meaningful insights into the definitions, benefits, and risks of virtual idol marketing. On this basis, this study further proposes an integrated framework established on the existing theories and research to explain the potential working mechanism of virtual idol marketing. This study can increase the accumulation of knowledge in the emerging field of virtual idol marketing, provide inspiration and decision-making assistance for brands to build connections with young consumers, especially Generation Z, and provide an avenue for future research in the field of virtual idol marketing.

1. Introduction

Virtual idols are dragged from the subculture group of ACGN (Animation, Comics, Games, Novel) to the mass market [1] with the rise of Generation Z. Generation Z (born between the mid-1990s and 2010s), the wholly digitally native generation who was brought up from birth to use digital technologies and social platforms, is expected to play the role of consumption engine for decades [2]. Due to Generation Z being the core audience of virtual idols [3], brands that are aware of their huge consumption power have started to utilize virtual idols as an important medium to influence Generation Z, especially in China and Japan. Therefore, virtual idols worshiped and loved by millions of fans (e.g., *Hatsune Miku*, *Luo Tianyi*, *A-SOUL*, *Ling*) have become a new type of digital endorsers favored by brands. Nowadays numerous brands have deployed virtual idol marketing campaigns in order to establish brand-consumer relationships with the young-generation consumers. For example, *Hatsune Miku*, the successful and popular international virtual idol, has endorsed brands including Google, Xiaomi, NASDAQ: GAME, Toyota, and so forth. See Table 1 for examples of virtual idols' brand endorsement.

The deployment of virtual idols in marketing campaigns is increasing, and virtual idol marketing has become an emerging social phenomenon and marketing practice. However, the knowledge in this new marketing field of virtual idol marketing remains limited presently. Huang et al. (2022) found that virtual idols had an impact on consumers' buying intention of brand clothing [4]. Yu and Kwong (2023) verified the efficacy of virtual idols on consumers' brand attitudes and purchase intention [5]. Although the efficacy of virtual idols as marketing agents has been proven to a certain extent, the emerging practice of virtual idol marketing is still not fully recognized, the meaning, unique benefits, and potential risks of virtual idol marketing need to be understood, and the working

mechanism within virtual idol marketing also needs to be fully revealed. Similarly, the marketing practice involved with avatars [6] and virtual influencers [7] is also rising in today's digital era. Avatars are "digital entities with anthropomorphic appearance, controlled by a human or software, that are able to interact" ([8], p. 5), virtual influencers refer to digitally created artificial humans associated with Internet fame ([9,10]), while virtual idols are known as computer-generated media celebrities [11] involved with idol activities. It can be seen that there is a lack of clear conceptual distinctions between virtual idols, avatars, and virtual influencers, which increases people's confusion regarding the understanding of the emerging marketing practice.

This study aims to increase the understanding of virtual idol marketing by means of an integrative review of past studies. On the basis of clarifying the key concepts and identifying the benefits and potential risks of virtual idol marketing, an integrated framework is proposed to explain the potential working mechanism of virtual idol marketing and research directions are provided for future research correspondingly. The work of this study can help increase the scientific understanding of virtual idol marketing, which can benefit both the theoretical advance and business practice of this new marketing field.

2. Virtual idols

2.1. Origin and development of virtual idols

The concept of virtual idols was first proposed in Japan. In 1984, with the context of the rapid growth of the Japanese animation and game industries, a virtual character named *Lynn Minmay* (also known as *Lynn Minmei*) from the famous animation series *Super Dimension Fortress Macross* and *Robotech* released her single, and the single successfully hit the famous Japanese music chart *Oricon*. This can be regarded as the first and successful exploration of creating virtual idols for human beings.

After the 1990s, with the progress of computer animation technology, people started to use computer technology to create virtual idols to replace human stars [12]. Since then, virtual idols including *Kyoko Date*, *Hatsune Miku*, *Luo Tianyi*, and *A-SOUL*, have been constantly produced and successfully become loved and worshiped objects by fans. Nowadays, virtual idols have become an important type of idol in the idol market, and the virtual idol industry has attracted engagement from capital investors (e.g., Byte Dance) and entertainment companies (e.g., Yue Hua Entertainment).

As computer-generated idols, virtual idols keep developing along with the progress of computer technology, especially in terms of appearance and interactive ability. As to appearance, virtual idols' appearance has developed from ACG style to super realistic style. ACG-style virtual idols have a cartoonish appearance, such as *Hatsune Miku* who is displayed as a typical Japanese cartoonish girl with vibrant, long, and turquoise-colored twin tails [13,14]. Virtual idols with realistic style are generated by advanced Computer-generated Imagery (CGI) technology, the details of the appearance features can reach a super realistic level and even blur the line between virtual and reality. For example, *Ling*, the girl who has exquisite and realistic features of oriental aesthetics always makes people confused about whether she is real or not. In terms of interactive ability, virtual idols are now developed to be able to interact with fans in real time with the support of technologies like social media, motion capture, and artificial intelligence. The development of appearance and interactive ability enable virtual idols to process idol charming and involve a variety of idol activities, which makes them become virtual digital celebrities.

Along with the development of virtual idols, avatars and virtual influencers have also appeared. Because these things exhibit a certain similarity, it is easy to cause confusion. In order to promote research in the field of virtual idol marketing, it is necessary to clarify the concepts between virtual idols, avatars, and virtual influencers.

2.2. Clarification of virtual idols, avatars, and virtual influencers

Virtual idols. Black (2006) pointed out that virtual idols were computer-generated media celebrities [11]. In the case studies of super virtual idol *Hatsune Miku*, Lam (2016) stated that the virtual J-Pop diva *Hatsune Miku* was a virtual celebrity and avatar icon of music creation technology [15]. Kobayashi and Taguchi (2018) further illustrated that *Hatsune Miku* was an anthropomorphic representation that uses voice synthesizer technology and could trigger a series of production and consumption phenomena [14]. Han, Lin and Zurlo (2021) regarded virtual idols as a new commercial outlet of the idol market, which had no living body but possessed developed fan groups and obvious advantages including permanence, satisfying fans' fantasies stably, and interactivity [1]. Zhang (2022) addressed virtual idols as the ones based on digital technologies to perform with virtual images, who had fans' support and related works, such as music, animation, film, and live streaming [16]. Huang, Qu and Li (2022) stated that virtual idols were human virtual images synthesized by computer and virtual reality technology, they were virtual digital celebrities and opinion leaders who were loved and admired by fans [4]. According to the above-illustrated references, the features of virtual idols include virtual bodies generated by computer-based technology [1,4,11,14–16], anthropomorphic appearance [4,11,14,15], idol activity engagement [15,

Table 1
Examples of virtual Idol's brand endorsement.

Virtual Idol	Brand Endorsement
Hatsune Miku	Google; Xiaomi; NASDAQ:GAME; Toyota; Lux; Sony; etc.
Luo Tianyi	Gillette; Tide; Pizza hut; whisper; L'Occitane; Nescafe; etc.
A-SOUL	L'Oreal Men; ASUS; KFC; Keep; Pico; etc.
Ling	Tesla; BVLGARI; GUCCI; Lancôme; Avon; etc.

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Table 2
Clarify virtual idols, avatars, and virtual influencers.

Concept	Definition	Key Features	Avatars	Virtual Influencers	Virtual Idols
Avatars	Digital entities with anthropomorphic appearance, controlled by a human or software, that are able to interact (Miao et al., 2022).	● anthropomorphic appearance; ● controlling entity; ● interactivity;	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Virtual Influencers	Digitally generated humans, who output attractive content around one particular domain and interact with audiences on social media thus enabling them to attract and influence followers.	● attractiveness; ● influence;		✓ ✓	✓ ✓
Virtual Idols	Computer-generated anthropomorphic exists, they are virtual celebrities engaged in idol activities that have the power to attract and influence fans.	● idol activities engagement;			✓

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16], and power of fan influence [1,4,14,16]. It can be seen that virtual idols are computer-generated representations with anthropomorphic appearance, indicating that virtual idols' behaviors need to rely on specific controlling entities. Meanwhile, virtual idols are virtual celebrities engaged in idol activities who possess fans' love and support and have the power to influence fans, which indicates that virtual idols possess the ability to attract fans and influence fans. In this sense, virtual idols can be regarded as computer-generated anthropomorphic representations, they are virtual celebrities engaged in idol activities that have the power to attract and influence fans.

Avatars. Avatars are "lifelike characters created by technology" ([17], p. 143). In the beginning, avatars refer to the computer-generated visual representations of individual internet users in the virtual world [18,19]. Along with the development of online businesses, avatars gradually become a popular marketing tool and are widely applied in various business contexts such as sales agents, website guides, advertising endorsement, and customer service agents [6,17,20,21], result in the rise of avatar-based marketing. However, "no strong consensus exists regarding their (avatars) precise definition" ([8], p. 2), which "makes it difficult for researchers to compare empirical results or draw meaningful conclusions across studies" ([8], p. 2). Therefore, in order to promote scientific knowledge, Miao et al. (2022) extracted three key definitional elements of avatars, namely anthropomorphic appearance, controlling entity, and interactivity, based on the literature review [8]. Then they defined avatars as "digital entities with anthropomorphic appearance, controlled by a human or software, that are able to interact" ([8], p. 5). According to Miao et al. (2022), their definition can precisely define the conceptual boundary of avatars, because among the academic papers they reviewed, "about half (51 %) include all of these elements in their conceptual definitions of avatars; the inclusion rates for each specific definitional element vary between 70 % and 90 %" ([8], p. 5). Therefore, to a certain extent, it can be believed that Miao et al. 's (2022) definition of avatars has a good generalization and representativeness.

Virtual influencers. Virtual influencers are digital personalities on social media platforms for influencing purposes [22]. As a new type of social media influencer, virtual influencers have become familiar to consumers as brand endorsers nowadays [23]. Being digital recreations with levels of human likeness [24], especially in terms of physical appearance, personality, and behavior [25], virtual influencers play a similar function as human influencers [26]. Despite not being made out of flesh and blood, virtual influencers possess all the characteristics of human influencers [27]. Virtual influencers have specific objectives and areas of expertise, they can attract followers with content and interact with followers online [23,28], and they can influence audiences' purchase behaviors the same as human influencers [27]. According to the research illustrated above, virtual influencers possess at least three following features. First, digital bodies [22,24,27]. Second, anthropomorphic appearance [22,24,25]. Third, human influencer-like in terms of behavior pattern and function [23,26,28], because virtual influencers utilize content and interactivity to attract followers and can influence their followers, the same as human influencers do. This indicates that virtual influencers are attractive and influential, attractiveness and influence can be regarded as the key features of virtual influencers. Therefore, virtual influencers can be regarded as digitally generated humans, who output attractive content around one particular domain and interact with audiences on social media thus enabling them to attract and influence followers. It can be seen that virtual influencers are consistent with the three key features of avatars illustrated by Miao et al. (2022) [8], which are anthropomorphic appearance, controlling entity, and interactivity. Besides these features, virtual influencers also exhibit attractiveness and influence.

According to the above discussion on virtual idols, avatars, and virtual influencers, correlation and distinction within the above concepts can be identified. As can be seen from Table 2, the concept of avatars covers the concepts of virtual influencers and virtual idols, and the concept of virtual influencers can cover the concept of virtual idols. First, both virtual idols and virtual influencers accord with the key features of virtual avatars. Virtual idols and virtual influencers are digital entities with anthropomorphic appearance and interactive capabilities that rely on controlling entities (humans or software) to act. However, avatars do not have to possess the key features of virtual influencers (i.e., attractiveness and influence) and key features of virtual idols (i.e., idol activities engagement). Secondly, virtual idols accord with the key features of virtual influencers (i.e., attractiveness and influence), but it is not necessary for virtual influencers to be involved with idol activities. By participating in idol activities, virtual idols can show their idol charm and thus be able to attract and influence fans. Therefore, it can be considered that virtual idols are a subtype of virtual influencers, and virtual influencers are a subtype of avatars.

By clarifying the conceptual boundaries between virtual idols, avatars, and virtual influencers, virtual idols are classified as virtual influencers and virtual avatars. Virtual idols are virtual influencers who engage in idol activities, in other words, virtual idols are avatars who attract audiences through idol effects and have a strong influence on their audiences. As virtual influencers and avatars that engaged in idol activities, the features virtual idols possessed enabled virtual idols to exhibit some unique advantages in marketing campaigns, leading to the rise of virtual idol marketing.

3. Virtual idol marketing

3.1. Definition of virtual idol marketing

With the rise of virtual idol marketing, people have started to try to understand what virtual idol marketing is. Huang, Qu and Li (2022) proposed that virtual idol marketing refers to enterprises promoting and selling their products by using virtual idols' fan appeal and influence [4]. The interpretation of virtual idol marketing by Huang et al. (2022) captures the key to virtual idol marketing, namely the application of the influence of virtual idols. However, are the marketing outcomes of virtual idols limited to promoting and selling products? In view of the limited research in the field of virtual idol marketing, in order to explore the potential efficacy of virtual idol marketing, this study decides to draw on reference in the field of influencer marketing, due to virtual idols being the subtype of virtual influencers as illustrated above.

De Veirman, Cauberghe and Hudders (2017) stated that influencer marketing was the practice in which brands stimulate influencers to endorse products and build brand image through the involvement of influencers [29]. Lou and Yuan (2019) considered influencer marketing as driving consumers' brand awareness and/or purchasing decisions by using the influencer's influence [30]. Martínez-López et al. (2020) regarded influencer marketing as the use of influencers to foster positive attitudinal and behavioral responses toward the brand in consumers, and the co-creation of the brand's image on social media as well [31]. Ye et al. (2021) defined influencer marketing as the involvement of influencers who have the credibility, following, and motivation to spread positive word of mouth on social media and vital impact on others' consumption decisions [32].

According to the above research, it can be seen that the essence of influencer marketing lies in utilizing the influence of influencers to achieve certain marketing outcomes, such as product endorsement, brand image, brand awareness, purchasing decisions, attitudinal and behavioral responses, word of mouth, and so forth. Since virtual idols are virtual influencers engaged in idol activities, it can be reasonably inferred that the potential marketing outcomes brought by virtual idols should also be able to cover the above scope. Therefore, virtual idol marketing can be seen as the utilization of the influence of virtual idols to achieve specific marketing outcomes, which include but are not limited to positive attitudes towards the brand/product, promotion of purchase, word of mouth, and so forth. The application of such marketing practice can bring some unique benefits to the brand, but it is also important to be aware of possible risks during the application.

3.2. Unique benefits of virtual idol marketing

Compared to other business practices involved with traditional digital celebrities (human celebrities and virtual influencers without idol activities engagement), virtual idol marketing is showing unique benefits as follows.

First, virtual idol marketing can attract and influence young-generation consumers. Virtual influencers can resonate with Millennials and Generation Z and influence these consumers' purchase behavior [25,26,33]. As the subtype of virtual influencers, virtual idols also present attractiveness and influence to the young generations. One research in China revealed that 92.3 % of virtual idol lovers are between 19 and 30 years old [3], which means the young generation, especially Generation Z, is the core group of virtual idol fans. Therefore, virtual idols have attracted brands from various industries to establish a connection with young-generation consumers, virtual idols thus have become popular brand endorsers.

Next, virtual idol marketing has a strong consumer appeal to fans. Consumption related to virtual idols is a way for fans to express their support and love toward their favorite virtual idols, as well as an important way for fans to construct and strengthen their roles and status within the fandom [34]. iiMedia Research (2021) [3] revealed that 70 % of virtual idol fans support their idols by buying endorsements or peripheral products, 76.8 % of respondents spend more than 200 yuan per month on virtual idols and 29.5 % spend 500~1000 yuan per month. Furthermore, 37.6 % of respondents reported that they would spend more on virtual idols compared with human idols. The data revealed that virtual idol marketing has advantages in driving fans' purchase motivation and power.

Moreover, virtual idol marketing has the advantage of efficiency. Virtual idols have incomparable working efficiency over human beings. As computer-generated digital entities, virtual idols do not need to rest and sleep, they will not get tired and sick, which enables them to stay productive all the time. Meanwhile, virtual idols do not need private schedules and vacations and can be available at all times [27]. Furthermore, virtual idols will not age, they can always show their youth and vitality to fans and keep the best performance. In addition, virtual idols are easier to manage and work with compared with human beings because they will not have personal emotions and cause the least conflict during the work [33]. These indicate that deploying virtual idols in the marketing campaign can ensure the campaign is in a highly efficient way.

Lastly, virtual idol marketing allows brands to have more control over the management of brand content creation and marketing risks [7,25,26]. In the stage of content creation, virtual idols' digital entities give brands more freedom to create appealing brand content [27]. Virtual idols can be projected with various stories and imaginations, thus giving people a larger imagination freedom in the brand story setting. As to marketing risks, virtual idols can greatly reduce marketing risks caused by endorsers. Compared with human endorsers, virtual idols are less likely to have scandals, and there is less possibility of a brand crisis caused by virtual idols' misbehavior. Hence, cooperation with virtual idols in the marketing campaign is a safe choice for brands, because it can reduce the negative impact on the brand caused by endorsers.

3.3. Potential risks of virtual idol marketing

However, according to the insights from academic research and business practice, some potential risks may exist during the implementation of virtual idol marketing.

One potential risk is that virtual idol marketing might be perceived as lacking authenticity and credibility. Virtual influencers are believed to lack the two cornerstones of real influence, namely authenticity and trust [33]. As virtual influencers, virtual idols might be questioned about the authenticity of their brand content as well. Because virtual idols are not real human beings, they will never have any honest brand opinions or preferences [33], and the content they describe is just the robot's imaginary life [25]. Thus, the perceived authenticity might affect virtual idols' credibility when virtual idols serve as brand endorsers. This might bring a limitation to the outcomes of virtual idol marketing.

Another potential risk of virtual idol marketing is the weakening of marketing effectiveness caused by technical errors or immaturity. Compared with marketing campaigns only involving human beings, the implementation of virtual idol marketing campaigns usually requires more technical support, especially in the context of real-time interaction. Therefore, errors or immaturity of technology may directly affect the performance of virtual idols in marketing campaigns, resulting in unsatisfactory marketing

effectiveness. For instance, in one marketing campaign of L'Occitane, brand endorser virtual idol *Luo Tianyi* presented a failed performance caused by a technical error through live streaming. The accident soon hit the headlines of social media in China. From the perspective of the brand, this virtual idol marketing campaign did not achieve satisfactory effectiveness as expected, and people's attention was attracted by the accident but not the brand itself. The involvement of virtual idols in a marketing campaign usually needs the support of technologies (e.g., dubbing, motion capture, and holographic projection). Therefore, technology is an important factor that needs to be taken into consideration when implementing virtual idol marketing, otherwise, the technical issue might weaken the effectiveness of virtual idol marketing campaigns.

The above definition, unique benefits, and potential risks of virtual idol marketing can increase the fundamental understanding of virtual idol marketing. However, understanding how virtual idol marketing works is of great significance to the practice and future research of virtual idol marketing. Based on this sense, an integrated framework is proposed in the next section to explain how virtual idol marketing might work.

4. An integrated framework of virtual idol marketing

On the ground of the established theories and research in related fields, this study takes the "stimulus–organism–response" (S–O-R) theory as the basic theoretical framework to build an integrated framework to explain the potential working paths of virtual idol marketing. The S–O-R theory explains the relationship between environmental stimuli, internal emotion and cognition of the organism, and external behavioral reaction, which is often utilized in consumer behavior research [35]. As mentioned above, virtual idols are a type of virtual influencers, and virtual idol marketing is essentially the utilization of the influence of virtual idols. Therefore, in the integration framework proposed in this study, the antecedents related to the influence of virtual idols are taken as the consumer stimulators, the affective response of consumers is taken as the intermediary, and marketing outcomes are taken as the reaction of consumers' behavior. Furthermore, fans' idolatry involvement and the product category the virtual idol endorsed are proposed as moderators between consumers' affective response and marketing outcomes in the integrated framework.

4.1. Antecedents associated with virtual idols' influence

According to previous studies in related fields including influencer marketing (e.g., [32]), para-social interaction (e.g., [36]), and celebrity endorsement (e.g., [37]), influential factors of virtual idols are believed associated with three aspects, which are the characteristics of virtual idols, the characteristics of content, and the characteristics of consumers.

4.1.1. Virtual idol characteristics

Influencer characteristics are regarded as important influential factors of influencer marketing effectiveness [32]. In line with influencer marketing, virtual idols' influence on fans is also believed to relate to virtual idol characteristics. Especially virtual idol's attractiveness. Physical and social attractiveness are identified as important determinants affecting social media influencers' influence [38–40]. In terms of the virtual idol marketing context, virtual idols' physical attractiveness is crucial to attracting fans' attention. It can determine fans' first impression [41], and influence fans' subsequent attitudes and behaviors [18,38]. Similarly, social attractiveness can improve fans' willingness to communicate and interact with virtual idols. It can help fans develop a relationship with virtual idols, and the relationship can impact virtual idols' influence [39].

Next is homophily. Homophily refers to the similarities between entities, which is an important factor in promoting interpersonal communication [42] and an important antecedent of influencers' influence on audiences [38,39,41,43]. Huang, Qiu, and Li (2022) proposed that when virtual idols had high homophily with fans in terms of character setting and value concept setting, the effectiveness of virtual idol marketing could be improved [4]. In addition, fans can perceive homophily with their favorite virtual idols during their idol-related content creation. Most virtual idols are only given basic character settings (e.g., gender, age, personality) when they are launched, such as *Hatsune Miku* and *Luo Tianyi*, the development of virtual idols mainly depends on fans' subsequent content creation. This is because fans are not only the consumers but also the producers of virtual idols [14]. In fans' content production, fans will impose their cognition, thoughts, and values on their favorite virtual idols [15]. Hence, virtual idols become the avatars that reflect fans' idealized selves, and fans can find the homophily between themselves and their favorite virtual idols in terms of thoughts and values, and this can drive fans to form a close relationship with their favorite virtual idols.

The third virtual idol characteristic is exposure [44,45]. Repeated exposure can increase people's friendships and trust in the media persona [44,46]. The more active and exposed the virtual idols are, the more fans can know the virtual idols, and it is easier for fans to develop a close relationship with them. Besides this, exposure is also closely related to virtual idols' popularity. Normally, virtual idols with high exposure have more chances to be noticed. This can increase virtual idols' chances of being popular, thus increasing virtual idols' influence [4].

Therefore, we propose that these virtual idol characteristics (i.e., physical attractiveness, social attractiveness, homophily, and exposure) are antecedent factors associated with virtual idols' influence.

Proposition 1. *Virtual idol characteristics (physical attractiveness, social attractiveness, homophily, exposure) may positively impact virtual idols' influence.*

4.1.2. Content characteristics

In the study of influencer marketing, content characteristics including appeal, sidedness, quality, hedonic value, expertise, and

prestige have been proven to have impacts on consumer's brand response [32,36]. Presently, the interaction between virtual idols and audiences is mainly completed through social media activities, such as posts and live streaming. Consequently, the content of posts or live streaming will directly affect audiences' feelings and interaction toward virtual idols, then subsequently influence virtual idols' popularity and influence. By referring to the prior research of influencer marketing, we propose that in the context of virtual idol marketing, content characteristics including creativity, appeal, and hedonic value can help to increase virtual idols' influence, thus laying a solid foundation for virtual idol marketing.

Creativity of content. Creative content can attract new fans and help virtual idols transfer the fans' traffic into commercial profits [1]. Hence, it is important for virtual idols to constantly find ways to produce creative content, which helps virtual idols build and maintain a huge fan base.

Appeal of content. The content posted by influencers is an indispensable bridge connecting influencers and audiences, and the appeal of content is positively related to the relationship between influencers and audiences [36]. For virtual idols, especially for virtual idols who mainly adopt live streaming, the content appeal is not only conducive to increasing the number of fans but also conducive to cultivating fans' engagement and loyalty.

Hedonic value of content. The hedonic value of content refers to the enjoyment, emotions, and entertainment that audiences experience from the content [47]. Studies show that the hedonic value of content has a positive impact on customer engagement, advertising, and brand attitudes [47,48]. Since virtual idols are mainly launched to meet people's spiritual and entertainment needs, the content provided by virtual idols is mainly focused on hedonic value rather than utility value. For this reason, the higher the hedonic value of the content provided by the virtual idol is, the more beneficial to expand the influence of the virtual idol.

Thus, we believe that the content is vital for virtual idols to attract and maintain fans on social media, as it is associated with virtual idols' influence. We suggest that:

Proposition 2. *Content characteristics (creativity, appeal, hedonic value) may positively impact virtual idols' influence.*

4.1.3. Consumer characteristics

The congruence between the fan's ideal self and the virtual idol may affect the influence of virtual idols. Because celebrities are people's reference points for their ideal self-congruence [37], as digital celebrities, when the influencer's image is in a high degree of congruence with consumers' ideal self-images, the endorsement outcomes will become more effective [49]. Similarly, if fans find that there is a high degree of congruence between their ideal selves and a virtual idol, it would be more likely that they would be attracted, develop an intimate relationship, and form an emotional attachment with the virtual idol. Therefore, we propose that consumers' congruence between their ideal selves and virtual idols may affect virtual idols' influence.

Proposition 3. *Consumer characteristics (i.e., ideal self-congruence) may positively impact virtual idols' influence.*

4.2. Mediation through consumers' affective responses: para-social interaction and emotional attachment

According to the CASA (Computers-Are-Social-Actors) paradigm, avatars will be treated as social actors, which will lead to human-computer interaction turning into a human-human one [50,51]. Miao et al. (2022) pointed out that human-avatar interaction is social and the interaction can induce consumers' cognitive, affective, and social responses, these responses might mediate avatars' influence on consumers' performance outcomes (e.g., purchase likelihood) [8]. Virtual idols are avatars involved in idol activities, the human-virtual idol interaction also can be explained by the CASA paradigm. Fans treat virtual idols as social actors, and their interaction with virtual idols can elicit affective responses as well. Para-social interaction is the interpersonal affective involvement [52,53] that is often used as a mediator to explain how influencer marketing works [38,39,54]. Emotional attachment is also considered an important affective response that can explain consumer's performance in influencer marketing [55,56]. Therefore, we expect that virtual idols' influence on fans' performance outcomes may be mediated by fans' affective responses, especially para-social interaction and emotional attachment.

4.2.1. Para-social interaction

Para-social interaction (PSI) is audiences' interpersonal affective involvement toward media persona [52,53]. It is a sense of friendship existing in audiences' imagination, which is audiences' one-direction, intimate [57], and illusory affective experience [58] toward the specific media persona. In the current research, PSI is widely used to help people understand how influencer marketing works [38,40,43,45,54,59]. The same as human influencers, virtual idols can induce fans' interpersonal affective involvement of PSI during fans' journey of virtual idol idolatry. During virtual idol idolatry, fans will form a one-direction and intimate sense of friendship with their favorite virtual idols. Fans will regard their favorite virtual idols as close friends, some fans will even regard their favorite virtual idols as soul mates and important parts of their real life. Thus, we believe that PSI can help to explain how virtual idol marketing works as well. Specifically, virtual idol characteristics (physical attractiveness, social attractiveness, homophily, and exposure), content characteristics (creativity, appeal, and hedonic value), and consumer characteristics (i.e., ideal-self congruence) may positively impact fans' PSI toward virtual idols and generate marketing outcomes with the mediation of PSI.

Virtual idol characteristics and PSI. Prior studies identified that physical attractiveness, social attractiveness, homophily, and exposure were antecedents of PSI, which could bring positive outcomes of influencer marketing with the mediation of PSI [38,40,45, 59]. Meanwhile, physical attractiveness, social attractiveness, attitude homophily, and exposure frequency of virtual idols were proven could bring positive marketing outcomes with the mediation of PSI in a specific cultural background [5]. Therefore, we propose:

Proposition 4. *Virtual idol characteristics (physical attractiveness, social attractiveness, homophily, exposure) may positively impact audiences' PSI, then bring positive marketing outcomes with the mediation of PSI.*

Content characteristics and PSI. The content provided by virtual idols is an important medium for fans to understand virtual idols, as well as an important stimulus to promote the interaction between fans and virtual idols. Accordingly, the content characteristics including appeal [36], creativity, and hedonic value may positively impact audiences' PSI toward virtual idols and then generate marketing outcomes. Consequently, we propose:

Proposition 5. *Content characteristics (creativity, appeal, hedonic value) may positively impact audiences' PSI, then bring positive marketing outcomes with the mediation of PSI.*

Consumer characteristics and PSI. Current research revealed that audiences' self-congruence with media characters (e.g., hosts of live-streaming programs) could enhance PSI and in turn, strengthen purchase intention [60]. Current research also pointed out that virtual idols that fit fans' ideal images could establish better relationships with fans [61]. Hence, if the fan's ideal self is more congruent with the virtual idol, it may help the fan form a stronger PSI toward the virtual idol and subsequently help bring positive marketing outcomes. Then, we propose that:

Proposition 6. *Consumer characteristics (i.e., ideal self-congruence) may positively impact audiences' PSI, and then bring positive marketing outcomes with the mediation of PSI.*

4.2.2. Emotional attachment

Attachment Theory originates from the study of affection response when children are separated from their mothers [62]. Emotional attachment refers to the strong emotional bond between an individual and the attachment target (a human or non-human entity) [63, 64]. Emotional attachment can cause consumers to behave toward the attachment target in a positive way, hence brands can use emotional attachment to influence consumers' behavior [65,66].

As non-human entities, virtual idols can provide the feeling of comfort and safety to fans, and they can be emotionally available whenever fans need them, which is the same as human attachment targets provide for people [62,67]. For fans, virtual idols are stable emotional sustenance and safe haven. They can always be available and provide company when fans experience loneliness and distress, just like old loyal friends. Moreover, as digital entities, virtual idols can help to build and maintain the world in fans' imagination. Virtual idols can be projected into various imaginations and rarely get involved in negative issues, which can keep the fans' utopia in the imagination to the greatest extent. Hence, in line with the human-robot attachment theory [63], fans can develop an emotional attachment to their beloved virtual idols.

Virtual idol characteristics and fans' emotional attachment. Prior research pointed out that homophily can increase the probability of frequent interaction [38], and frequent interaction can contribute to the formation of emotional attachment. Ladhari, Massa and Skandrani (2020) further found that homophily in the dimensions of attitude and value had a significant positive impact on viewers' emotional attachment to YouTube Vloggers, then can increase viewers' purchases [68]. Meanwhile, previous studies also pointed out that exposure and interaction on social media could lead to psychological proximity and emotional attachment to influencers [68,69]. Therefore, we believe virtual idol characteristics (homophily and exposure) may positively impact fans' emotional attachment to virtual idols and then bring positive marketing outcomes.

Proposition 7. *Virtual idol characteristics (homophily, exposure) may positively impact fans' emotional attachment, then bring positive marketing outcomes with the mediation of emotional attachment.*

Content characteristics and fans' emotional attachment. Previous research has confirmed that content characteristics can influence consumers' emotional attachment to social media influencers [55,64]. The first content characteristic is creativity. Novel content can provide a novel experience to fans, creative content helps to attract fans' attention and get their approval, then leads to a positive impact on fans' emotional attachment to the influencer [64]. The next content characteristic is appeal. Attractive content can meet the specific needs of consumers and lead to a strong emotional attachment to the content provider. For example, content with aesthetic pleasure can satisfy people's ideality need while expert content can satisfy people's competence need, and the fulfillment of these needs can promote people's emotional attachment to the content providers on social media [55]. Therefore, when reading content on social media, the appeal of content is positively correlated with audiences' emotional attachment to the influencer [64]. The last content characteristic is hedonic value. Enjoyment is the main reason for people to use social media [64], social media content with hedonic value can meet the entertainment needs of social media users, and it also can arouse and deepen social media users' engagement [47]. Therefore, we propose that:

Proposition 8. *Content characteristics (creativity, appeal, hedonic value) may positively impact fans' emotional attachment, then positive marketing outcomes with the mediation of emotional attachment.*

Consumer characteristics and fans' emotional attachment. Emotional attachment occurs when people perceive the attributes of a potential attachment target that are congruent with their self-concept, however, if people perceive that the attributes of the potential attachment target are incongruent with the self, they will not generate attachment emotions and behaviors [63]. Therefore, self-congruence is an important factor determining the formation of emotional attachment, recent study confirmed there is a positive correlation between ideal self-congruence and celebrity attachment [37].

Virtual idols will be projected fans' ideal selves in fans' idol-related content production, and virtual idols will be shaped and developed to the images congruent with fans' ideal selves. Thus, we expect the congruence between fans' ideal selves and virtual idols

can arouse fans' attachment emotions and behaviors and then bring benefits for virtual idol marketing.

Proposition 9. *Consumer characteristics (i.e., ideal self-congruence) may positively impact fans' emotional attachment, then bring positive marketing outcomes with the mediation of emotional attachment.*

4.3. Outcomes of virtual idol marketing

Existing studies proved that PSI and emotional attachment both could bring marketing outcomes including attitude, purchase intention, word-of-mouth, and so forth. Therefore, we believe that under the mediating effects of PSI and emotional attachment, the outcomes of virtual idol marketing may include the following.

4.3.1. Attitude toward products and brands
Audiences' PSI toward media characters helps audiences generate positive attitudes toward the products [44,70] and brands [54, 71] endorsed by media characters. Therefore, we suggest that fans' PSI toward virtual idols can also have a positive impact on their attitudes toward the products and brands endorsed by their favorite virtual idols.

Proposition 10. *Fans' PSI toward virtual idols may positively impact their attitudes toward the products and brands endorsed by their favorite virtual idols.*

In addition, audiences' emotional attachment to social media influencers has been verified to help transfer positive emotions to the products or brands endorsed by social media influencers [55]. Accordingly, under the effect of attachment transfer, fans' emotional attachment to virtual idols is expected to help generate a positive evaluation of the products or brands endorsed by their favorite virtual idols.

Proposition 11. *Fans' emotional attachment to virtual idols may positively impact their attitudes toward the products and brands endorsed by their favorite virtual idols.*

4.3.2. Purchase intention
In the research of marketing outcomes related to PSI, purchase intention is the focus of current research. Many studies verified that audiences' PSI toward social media influencers could positively impact their purchase intention [36,38,39,43,44,70]. In addition, a prior study also pointed out that audiences' emotional attachment to social media influencers could increase the perceived influence, leading to a higher intention to purchase the brands recommended by the influencers [56]. Therefore, we expect fans' PSI and emotional attachment toward virtual idols may positively impact their purchase intention to the brands endorsed by virtual idols as well.

Proposition 12. *Fans' PSI toward virtual idols may positively impact their purchase intention of the brands endorsed by their favorite virtual idols.*

Proposition 13. *Fans' emotional attachment to virtual idols may positively impact their purchase intention of the brands endorsed by their favorite virtual idols.*

4.3.3. Word-of-mouth (WOM)
The PSI formed by audiences toward media characters can increase audiences' trustworthiness in the media characters [70] and improve the perceived brand quality, brand affect, and brand preference [72]. These can contribute to the positive WOM of the brand. Similarly, emotional attachment to social media influencers can also lead to a higher positive WOM [56]. Therefore, we believe that WOM is also one of the possible outcomes of virtual idol marketing, fans' PSI and emotional attachment toward virtual idols can help to bring a positive impact on the WOM of the brands endorsed by virtual idols.

Proposition 14. *Fans' PSI toward virtual idols may positively impact the WOM of the brands endorsed by their favorite virtual idols.*

Proposition 15. *Fans' emotional attachment to virtual idols may positively impact the WOM of the brands endorsed by their favorite virtual idols.*

4.4. Moderators

In marketing research, consumer behavior is often influenced by consumer involvement and product category. Therefore, the degree of consumer involvement in virtual idol idolatry and the category of products endorsed by virtual idols are believed can regulate the impact of consumers' emotional responses (i.e., para-social interaction, and emotional attachment) on marketing outcomes (i.e., attitude, purchase intention, and word of mouth).

4.4.1. Idolatry involvement
Each fan's level of involvement in idolatry is different. Fans' idolatry involvement will be affected by a variety of factors, such as age, income, education, culture, role, and status in the fandom. In general, the higher the idolatry involvement of the fan is, the more likely the fan's behavior and consumption will be influenced by the favorite idol. For example, fans with higher involvement in idolatry will tend to have stronger purchase intentions in order to gain a higher status within the fandom [34]. Therefore, the prior study

revealed that fans with higher involvement in idolatry were willing to spend more time and energy on their favorite virtual idols, and their emotions towards the virtual idols were more easily transferred to the brands endorsed by the virtual idols and then help fans to form positive brand attitudes [4] and brand WOM. Then, we propose:

Proposition 16. *The outcomes of virtual idol marketing (attitude, purchase intention, WOM) may be moderated by audiences' involvement in idolatry, fans' higher idolatry involvement may lead to better marketing outcomes.*

4.4.2. Product category

The outcomes of virtual idol marketing may be moderated by product category (hedonic goods vs. utilitarian goods) as well because consumers' choices are usually driven by hedonic and utilitarian considerations [73]. Hedonic goods refer to products or services that enable people to obtain aesthetic or sensual pleasure, fantasy, and fun, such as jewelry, chocolate, and music [74]. Utilitarian goods refer to products or services that are based on rational cognition, instrumental, and goal-oriented, the ones that can accomplish certain functions or practical tasks, such as microwaves, laundry detergent, and security systems [75]. In an investigation of virtual influencers, the majority of respondents agreed that brands from fashion, lifestyle, luxury, and entertainment could benefit from collaborating with virtual influencers [25]. Since these brands are more inclined to provide hedonic value and considering that the congruence between celebrities and products will affect the outcomes of digital celebrity endorsement [43,70], we believe that virtual idols are more suitable to endorse hedonic products or services. Because virtual idols are designed and launched for entertaining and spiritual needs, they are fitter with hedonic rather than utilitarian products/services. Thus, we put forward that:

Proposition 17. *The outcomes of virtual idol marketing (attitude, purchase intention, WOM) may be moderated by product category (hedonic goods vs. utilitarian goods), compared with utilitarian goods, virtual idols' endorsement of hedonic goods may lead to better marketing outcomes.*

Based on the above discussion, the potential working mechanism of virtual idol marketing can be illustrated in an integrated framework, as Fig. 1 shows below. The integrated framework proposed by this study is established on the basis of existing theories and research in the related domains, it has a strong theoretical foundation. Meanwhile, the integrated framework proposed by this study exhibits certain comprehensiveness and novelty. The potential virtual idol marketing working paths are considered comprehensively in the integrated framework, and the effort this study made has not been found in past studies. The integrated framework proposed by this study can provide research directions for future study in the virtual idol marketing field, it also can accommodate new research questions and areas of inquiry as the field advances, such as purposing new antecedents, mediators, outcomes, and moderators in the proposed integrated framework.

5. Research directions

The integrated framework we proposed generates future research directions for studies in the domain of virtual idol marketing. These research directions can be grouped into four areas: (1) antecedents associated with virtual idols' influence, (2) mediation
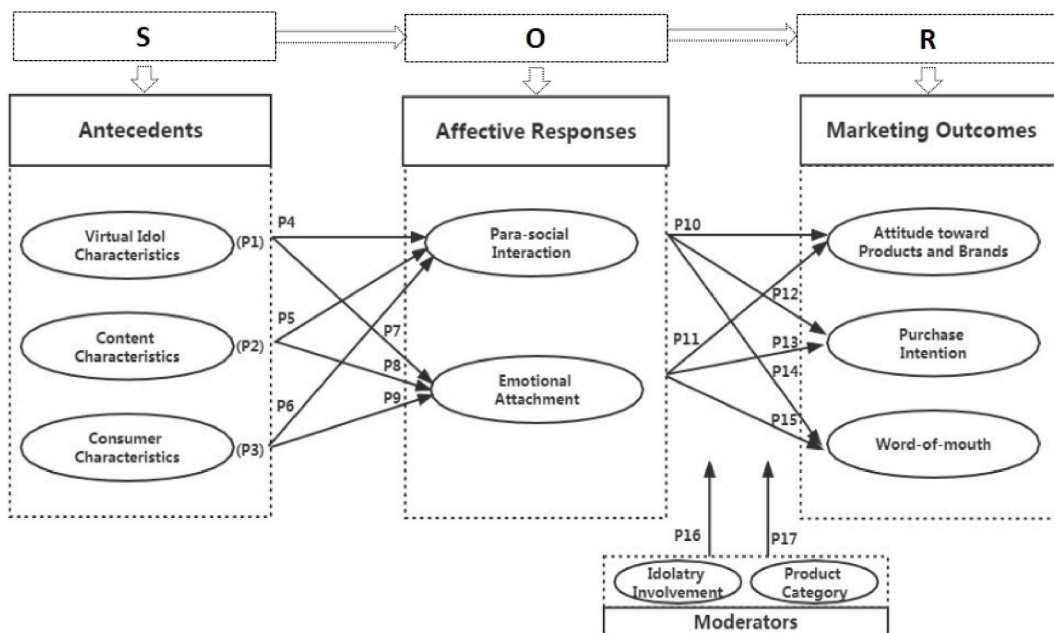

Fig. 1. Integrated Framework of Virtual Idol Marketing Working Mechanism.

Table 3
Research directions of virtual idols marketing.

Components	Research Proposition Objects	Research Propositions
antecedents associated with virtual idols' influence	Study virtual idol characteristics associated with virtual idols' influence: - physical attractiveness - social attractiveness - homophily - exposure	P1: Virtual idol characteristics (physical attractiveness, social attractiveness, homophily, exposure) may positively impact virtual idols' influence.
	Study content characteristics associated with virtual idols' influence: - creativity - appeal - hedonic value	P2: Content characteristics (creativity, appeal, hedonic value) may positively impact virtual idols' influence.
	Study consumer characteristics associated with virtual idols' influence: - ideal self-congruence	P3: Consumer characteristics (i.e., ideal self-congruence) may positively impact virtual idols' influence.
mediation through fans' affective responses	Study the influence of virtual idol characteristics on marketing outcomes under the mediation of PSI: - physical attractiveness - social attractiveness - homophily - exposure	P4: Virtual idol characteristics (physical attractiveness, social attractiveness, homophily, exposure) may positively impact audiences' PSI, then bring positive marketing outcomes with the mediation of PSI.
	Study the influence of content characteristics on marketing outcomes under the mediation of PSI: - creativity - appeal - hedonic value	P5: Content characteristics (creativity, appeal, hedonic value) may positively impact audiences' PSI, then bring positive marketing outcomes with the mediation of PSI.
	Study the influence of consumer characteristics on marketing outcomes under the mediation of PSI: - ideal self-congruence	P6: Consumer characteristics (i.e., ideal self-congruence) may positively impact audiences' PSI, and then bring positive marketing outcomes with the mediation of PSI.
	Study the influence of virtual idol characteristics on marketing outcomes under the mediation of emotional attachment: - homophily - exposure	P7: Virtual idol characteristics (homophily, exposure) may positively impact fans' emotional attachment, then bring positive marketing outcomes with the mediation of emotional attachment.
	Study the influence of content characteristics on marketing outcomes under the mediation of emotional attachment: - creativity - appeal - hedonic value	P8: Content characteristics (creativity, appeal, hedonic value) may positively impact fans' emotional attachment, then bring positive marketing outcomes with the mediation of emotional attachment.
	Study the influence of consumer characteristics on marketing outcomes under the mediation of emotional attachment: - ideal self-congruence	P9: Consumer characteristics (i.e., ideal self-congruence) may positively impact fans' emotional attachment, then bring positive marketing outcomes with the mediation of emotional attachment.
marketing outcomes generated by virtual idols	Study attitudinal outcomes brought by PSI in the virtual idols' endorsement: - attitude toward products - attitude toward brands	P10: Fans' PSI toward virtual idols may positively impact their attitudes toward the products and brands endorsed by their favorite virtual idols.
	Study attitudinal outcomes brought by emotional attachment in the virtual idols' endorsement: - attitude toward products - attitude toward brands	P11: Fans' emotional attachment to virtual idols may positively impact their attitudes toward the products and brands endorsed by their favorite virtual idols.
	Study purchase intention outcome brought by PSI in the virtual idols' endorsement	P12: Fans' PSI toward virtual idols may positively impact their purchase intention of the brands endorsed by their favorite virtual idols.
	Study purchase intention outcome brought by emotional attachment in the virtual idols' endorsement	P13: Fans' emotional attachment to virtual idols may positively impact their purchase intention of the brands endorsed by their favorite virtual idols.
	Study WOM outcome brought by PSI in the virtual idols' endorsement	P14: Fans' PSI toward virtual idols may positively impact the WOM of the brands endorsed by their favorite virtual idols.
	Study WOM outcome brought by emotional attachment in the virtual idols' endorsement	P15: Fans' emotional attachment to virtual idols may positively impact the WOM of the brands endorsed by their favorite virtual idols.
moderating effects on the outcomes of virtual idol marketing	Study the moderating effect of idolatry involvement on outcomes of virtual idol marketing	P16: The outcomes of virtual idol marketing (attitude, purchase intention, WOM) may be moderated by audiences' involvement in idolatry, fans' higher idolatry involvement may lead to better marketing outcomes.
	Study the moderating effect of product category on outcomes of virtual idol marketing	P17: The outcomes of virtual idol marketing (attitude, purchase intention, WOM) may be moderated by product category (hedonic goods vs. utilitarian goods), compared with utilitarian goods, virtual idols' endorsement of hedonic goods may lead to better marketing outcomes.

through fans' affective responses, (3) possible marketing outcomes generated by virtual idols, and (4) moderating effects on the outcomes of virtual idol marketing. We believe these future research areas can help people better understand how virtual idol marketing works. The four research areas include seventeen propositions as discussed above, see Table 3.

Antecedents associated with virtual idols' influence. The influential factors determine the persuasion effect of virtual idols in virtual idol marketing, hence it is crucial to explore the antecedents associated with virtual idols' influence. In this domain, with a synthesis of previous studies including virtual idols, influencer marketing, and para-social interaction (e.g., [15,32,45]), we propose three groups of antecedents that may closely be associated with virtual idols' influence, namely virtual idol characteristics, content characteristics, and consumer characteristics. We believe virtual idol characteristics (physical attractiveness, social attractiveness, homophily, and exposure) are important factors that can elicit fans' social and affective responses and then help increase virtual idols' influence. Due to social media being the main stage for virtual idols to attract and interact with fans, the content provided by virtual idols plays a vital role in virtual idols' influence as well. Creativity, appeal, and hedonic value are the key characteristics that decide whether fans will be attracted to and interact with virtual idols. For consumer characteristics, in line with the prior studies of celebrities, we expect the congruence between fans' ideal selves and virtual idols may affect fans' willingness to follow and likeness toward virtual idols.

Mediation through fans' affective responses. According to studies in the domain of avatars, avatar-based marketing, and influencer marketing, consumer affective responses can be used to explain virtual idols' influence on consumer performance outcomes (e.g., [8,38,69]). We believe virtual idols' strong influence on fans is deeply rooted in the fans' affection for their favorite virtual idols and fans' affective responses toward virtual idols can be presented through para-social interaction and emotional attachment. Hence, we propose PSI and emotional attachment as the fans' affective responses that could mediate the outcomes of virtual idol marketing. We believe fans' love and support for their favorite virtual idols will be reinforced by their affective involvement, leading to positive outcomes of virtual idol marketing.

Possible marketing outcomes generated by virtual idols. Based on the previous studies, we propose attitude toward products and brands, purchase intention, and WOM as the possible marketing outcomes of virtual idol marketing (e.g., [43,54,56]). According to the Affect Transfer Theory [76], we believe that fans' affection toward virtual idols can transfer to the products and brands endorsed by virtual idols then lead to a positive attitude, purchase intention, and WOM toward the products and brands.

Moderating effects on the outcomes of virtual idol marketing. Virtual idols' influence on each fan is different because different fan has different idolatry involvement with their favorite virtual idols, and this may bring different fans' performance outcome in virtual idols' endorsement. Accordingly, we expect that fans' idolatry involvement may moderate the outcomes of virtual idol marketing. Furthermore, the fit between endorsers and brands can impact the effect of brand endorsement (e.g., [43]), hence we expect that virtual idols are more suitable for the endorsement of hedonic goods rather than utility goods.

Future studies can adopt qualitative and/or quantitative research to verify the propositions mentioned above. Moreover, other variables which do not include in the integrated framework of this study also can be considered by future studies. For example, other influential factors associated with virtual idols influence, other mediators that can help explain the influence of virtual idols on consumers' performance outcomes, other marketing outcomes brought by virtual idols, and other moderators that may affect the consequences of virtual idol marketing.

6. Conclusion and limitation

The practice of utilizing virtual idols as marketing agents is starting to catch on among brands, especially among the brands that want to build connections with Generation Z. However, there is a lack of scientific understanding of this emerging marketing practice. This study promotes an understanding of virtual idol marketing from the fundamental knowledge, including what virtual idols and virtual idol marketing are, the benefits, risks, and potential working mechanisms of virtual idol marketing. This study can provide inspiration for brands to better engage with young consumers, especially Generation Z, and help brands make managerial decisions before virtual idol marketing deployment. The integrated framework and research directions proposed in this study can provide an avenue for future research in the field of virtual idol marketing.

However, although the integrated framework of the virtual idol marketing working mechanism proposed in this study is established on a profound theoretical basis and shows comprehensiveness and novelty, no empirical research has yet to fully examine the propositions within the integrated framework. The efficacy of the integrated framework can be evaluated in the future through empirical research.

Data availability statement

No data was used for the research described in the article. Therefore, there is no data associated with this study deposited into a publicly available repository.

Credit authorship contribution statement

Yunzhu Yu: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Simon CM. Kwong:** Supervision. **Achaya Bannasilp:** Writing – review & editing, Writing – original draft.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:Yunzhu Yu reports financial support was provided by Guangdong Planning Office of Philosophy and Social Science. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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