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# Futures Studies on the Nature of Commercial Advertising in the Metaverse

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## ABSTRACT

This study aimed to identify and futures-orient the emerging drivers, transformations, opportunities, risks, and critical uncertainties likely to shape the future nature of commercial advertising in the metaverse. This applied, exploratory study used a qualitative futures-studies design. The study population comprised experts in advertising, digital marketing, communication, media, information technology, emerging technologies, digital business, consumer behavior, and futures studies in Tehran. Using purposive sampling with maximum variation, 24 experts were recruited until theoretical and informational saturation was achieved. Data were collected through semi-structured, in-depth interviews focused on emerging characteristics of metaverse advertising, technological and behavioral drivers, commercial opportunities, ethical and regulatory challenges, and plausible future developments. Interviews were transcribed verbatim and analyzed through qualitative thematic analysis combined with futures-oriented structural interpretation. Extracted themes were subsequently evaluated in terms of importance and uncertainty to identify key drivers and critical uncertainties and to construct alternative future scenarios. The analysis identified seven overarching themes and 36 subthemes characterizing the future of commercial advertising in the metaverse. Artificial intelligence and generative AI had the highest mean importance score (4.83), followed by virtual and augmented reality technologies (4.79), consumer adoption of metaverse environments (4.75), and privacy and behavioral-data regulation (4.71). Consumer adoption (uncertainty mean = 4.42), emerging legal frameworks (4.38), privacy regulation (4.33), biometric and emotional data use (4.29), trust in metaverse platforms and brands (4.21), and interoperability (4.13) emerged as major critical uncertainties. Four alternative scenarios were developed: Immersive Responsible Ecosystem, Hyper-Commercialized Metaverse, Regulated but Fragmented Metaverse, and Limited-Adoption Virtual Market. Commercial advertising in the metaverse is likely to evolve from discrete, message-centered promotion toward immersive, personalized, data-driven, participatory, and environmentally embedded commercial experiences, while its sustainable development will depend substantially on consumer trust, regulatory governance, privacy protection, technological accessibility, and platform structures.

**Keywords:** Metaverse; Commercial Advertising; Futures Studies; Digital Marketing; Immersive Advertising; Artificial Intelligence; Consumer Behavior; Scenario Planning

## Introduction

The rapid evolution of immersive digital technologies has introduced the metaverse as one of the most consequential emerging environments for the future of commercial communication, marketing, consumer interaction, and digital business. Although the metaverse remains conceptually and technologically fluid, it is




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generally associated with interconnected, persistent, immersive, and interactive virtual environments in which individuals can communicate, work, socialize, create, consume, and conduct economic activities through avatars and other forms of digital representation. Its technological infrastructure draws on virtual reality, augmented reality, artificial intelligence, blockchain, digital twins, cloud computing, advanced networking, and interactive platforms, collectively enabling forms of presence and participation that extend beyond conventional websites and social media platforms (1). From a business perspective, the significance of the metaverse lies not merely in the creation of another digital channel but in the possibility of reorganizing the relationship among firms, consumers, data, digital identities, platforms, and commercial transactions. This development is increasingly associated with data-driven transformation in business models, where metaverse integration can alter value creation, customer engagement, organizational processes, and the architecture of digital markets (2). Consequently, the emergence of the metaverse raises a fundamental question for advertising scholarship: whether commercial advertising in these environments should still be understood primarily as the communication of persuasive messages or whether its nature is transforming into a more immersive, adaptive, experiential, and continuously embedded form of commercial interaction.

Advertising has historically evolved in parallel with dominant media technologies. Print media institutionalized mass visual and textual advertising; radio and television introduced audiovisual storytelling at scale; the internet enabled searchable, measurable, and interactive promotion; and social media transformed consumers into participants, content producers, data sources, and distributors of branded messages. The metaverse potentially represents a further discontinuity because it combines media, marketplace, social space, entertainment environment, and experiential interface within the same digital architecture. Previous research has therefore described the metaverse as an emerging frontier of digital marketing in which conventional advertising principles intersect with immersive experiences, virtual communities, avatar-mediated interaction, and new forms of consumer behavior (3, 4). Early analyses of the advertising industry similarly suggest that the metaverse may shift promotional communication toward more interactive, experiential, and technologically sophisticated formats capable of integrating brand messages into the virtual activities of consumers (5). This shift suggests that the conceptual boundaries of advertising itself may become increasingly difficult to define, particularly when brand experiences are embedded within games, virtual stores, social encounters, events, digital objects, and artificially generated environments.

One of the most important characteristics of this transformation is the movement from advertising exposure toward brand experience. In conventional digital advertising, consumers commonly encounter advertisements as identifiable units such as banners, sponsored posts, video advertisements, search results, or influencer endorsements. In immersive environments, by contrast, consumers may enter branded spaces, manipulate virtual products, attend commercial events, interact with brand avatars, experience simulated services, or purchase virtual goods without encountering a clearly bounded advertising message. Research on digital fashion marketing demonstrates that metaverse environments can expand brand experience by enabling users to engage with fashion products and branded identities through virtual participation rather than merely visual observation (6). Similar developments have been observed in hospitality, where emerging technologies are increasingly being integrated with established marketing principles to create richer customer experiences and new forms of service engagement (7). These developments indicate that the future of commercial advertising may depend less on increasing message

frequency and more on designing immersive environments in which brand meaning emerges through interaction, participation, simulation, and experience.

The changing role of consumers is equally central. In metaverse environments, consumers may no longer function solely as recipients of advertising but as participants who shape commercial content, customize virtual products, interact with other users, influence brand visibility, and construct digital identities through consumption. The rise of virtual goods, non-fungible tokens, and digital ownership mechanisms has already encouraged firms to reconsider conventional business models and explore new forms of value creation within virtual economies (8). The broader commodification of virtual spaces also raises philosophical and societal questions regarding the increasing incorporation of social interaction, identity, creativity, and digital experience into market relationships (9). Moreover, the development of metaverse economies may intensify forms of consumption culture in which identity expression becomes increasingly linked to virtual products, avatars, branded digital assets, and platform-mediated social visibility (10). Thus, commercial advertising in the metaverse may increasingly operate through identity construction and symbolic participation rather than simply through product information or persuasive claims.

The emergence of virtual influencers, artificial agents, and avatar-based communication further illustrates this transformation. Virtual influencers already represent a distinctive form of digitally constructed endorsement in which trust, authenticity, personality, and brand association are mediated through artificial or fictional personas (11). Within the metaverse, such actors may become more interactive, persistent, and responsive, potentially functioning as autonomous brand representatives capable of engaging users continuously. Studies of influencer-brand collaborations in metaverse-related settings demonstrate that virtual environments can become platforms for novel forms of influencer marketing and branded partnerships (12). Likewise, virtual anchors and digitally generated presenters are increasingly being explored in relation to live broadcasting, suggesting that future commercial communication may increasingly rely on synthetic or AI-mediated personalities (13). These developments complicate established distinctions between human spokespersons, programmed interfaces, advertising content, entertainment, and social interaction and therefore create new questions concerning transparency, authenticity, trust, and consumer recognition of persuasive intent.

Artificial intelligence is expected to intensify these changes by enabling highly adaptive and personalized advertising. Digital marketing and branding in the metaverse are increasingly linked to the combined dynamics of AI, immersive technologies, and data analytics, allowing marketers to customize consumer experiences on the basis of behavioral patterns, preferences, interaction histories, and contextual information (14). Programmatic advertising may become increasingly automated in metaverse environments, with algorithms determining not only which message is displayed but also how virtual commercial environments respond to particular users in real time (15). The result could be a movement from personalized advertisements toward personalized realities, where the structure, appearance, sequence, timing, and commercial content of a virtual environment differ across individuals. Research examining advertising appeals in the metaverse further demonstrates the importance of determining which persuasive strategies are most effective within these new environments, suggesting that conventional advertising appeals may require reconsideration in relation to immersive and interactive contexts (16).

Such personalization is likely to depend on increasingly sophisticated forms of consumer data. Metaverse technologies can potentially capture not only clicks, purchases, or browsing histories but also spatial movements, gaze patterns, gestures, interpersonal interactions, physical responses, and other behavioral or biometric signals. Neuromarketing approaches may therefore gain strategic importance because immersive environments create new

possibilities for understanding attention, affective responses, and decision-making processes at levels that were previously difficult to observe (17). However, the same data richness that increases advertising effectiveness also introduces profound concerns regarding surveillance and autonomy. McStay argues that the metaverse may generate new forms of surveillant infrastructure in which the physical and emotional dimensions of users become integrated into systems of digital governance and commercial observation (18). The future of commercial advertising must therefore be examined not only through the lens of effectiveness and innovation but also through the ethical implications of continuous monitoring, inferred psychological states, and the commercialization of intimate behavioral information.

These concerns are especially important because immersive advertising may reduce the perceptual distance between persuasion and experience. When advertising is embedded in a virtual environment, users may not always clearly recognize where ordinary interaction ends and commercial persuasion begins. This issue is already visible in emerging forms of immersive marketing. Research on alcohol marketing and commerce in metaverse environments demonstrates how brands can integrate promotional content, virtual experiences, and commercial transactions in ways that extend established digital marketing practices into more immersive settings (19). Regulatory debates in other areas of digital marketing also show the difficulty of controlling commercial influence when promotion is embedded across complex online ecosystems. For example, expert evaluations of restrictions on unhealthy food marketing indicate that even ambitious regulatory measures may face limitations when commercial communication migrates across digital platforms and adopts new technological forms (20). These developments imply that existing advertising regulations, which frequently assume identifiable advertisements, identifiable advertisers, and geographically bounded audiences, may be insufficient for persistent and borderless metaverse environments.

The legal status of advertising within the metaverse consequently remains an important area of uncertainty. A quasi-legal examination of metaverse advertising emphasizes the challenges created by virtual identities, jurisdiction, data use, consumer rights, platform governance, and the ambiguous legal characterization of emerging commercial practices (21). Intellectual property rights represent another major concern because metaverse environments enable the reproduction, modification, exchange, and commercialization of digital objects in ways that may generate disputes concerning trademarks, copyrights, design rights, and ownership (22). The economic activities occurring within virtual worlds can also create new taxation questions, particularly when virtual assets, transactions, and income possess both digital and real-world value (23). Likewise, accounting and auditing practices must adapt to electronic transactions conducted within metaverse environments, particularly where transactions involve digital assets, decentralized systems, or virtual currencies (24). Advertising therefore cannot be studied separately from the legal and economic infrastructures that determine how virtual commercial exchanges are recognized, governed, taxed, audited, and protected.

The expanding economic value of virtual environments also encourages businesses to develop new monetization strategies. Research on creative industries has identified a broad range of monetization mechanisms associated with digital content, virtual experiences, subscription systems, platform economies, digital goods, and creator participation (25). In the metaverse, advertising may increasingly intersect with these mechanisms so that the distinction between promotional communication and direct monetization becomes less clear. A branded virtual object, for example, can simultaneously function as an advertisement, a consumer good, an identity symbol, a social signal, and a revenue-generating asset. The emergence of financial technologies in the metaverse may further

reshape consumer behavior by integrating payments, digital assets, virtual ownership, and new transaction mechanisms directly into immersive environments (26). This integration suggests that future advertising could become inseparable from purchasing architecture, allowing consumers to transition immediately from exposure or interaction to acquisition without leaving the virtual experience.

Large brands have already begun experimenting with these possibilities. Nike's early engagement with virtual products and metaverse-related initiatives illustrates how established companies can extend brand identity, consumer engagement, and product strategies into virtual environments (27). Subsequent analyses of Nike's marketing strategy also demonstrate how digital innovation can be incorporated into broader brand positioning and consumer engagement strategies in competitive industries (28). Such examples indicate that firms may increasingly treat the metaverse not merely as a campaign environment but as a strategic extension of the brand itself. Rather than purchasing advertising space in someone else's medium, companies may construct persistent virtual worlds, communities, experiences, products, and identities. This transformation could fundamentally alter the conventional advertising model because the brand becomes part of the environment through which consumers interact, rather than an external communicator attempting to interrupt that environment.

At the same time, the continued development of the metaverse is not guaranteed. The trajectory of metaverse technologies has already been characterized by cycles of intense attention, investment, skepticism, and declining public enthusiasm, demonstrating that technological expectations do not necessarily translate into sustained adoption (29). Research examining the broader business implications of the metaverse nevertheless argues that organizations should prepare for a potential paradigm shift in which immersive digital technologies alter business operations, markets, consumer relationships, and strategic planning (30). This tension between transformative potential and uncertain adoption makes the metaverse particularly appropriate for futures research. Forecasting its advertising implications cannot depend solely on linear extrapolation from current practices because the future will be shaped by interactions among technological maturation, infrastructure affordability, consumer acceptance, regulatory intervention, platform competition, social trust, and evolving cultural norms.

Consumer acceptance is especially important because immersive technologies generate value only when users perceive them as useful, enjoyable, trustworthy, and socially meaningful. Research on esports engagement shows that motivations and attitudes toward the metaverse and NFTs can affect viewer engagement, suggesting that attitudes toward emerging virtual technologies have significant behavioral consequences (31). Similarly, the future of sustainable consumption in the metaverse remains dependent on how virtual experiences affect consumer values, consumption patterns, environmental perceptions, and the relationship between digital and physical goods (32). These considerations highlight the social dimension of metaverse advertising: technological sophistication alone will not determine its future. Users' willingness to enter immersive commercial environments, disclose personal data, interact through avatars, purchase virtual goods, and accept algorithmically tailored experiences will influence whether metaverse advertising becomes mainstream, remains niche, or develops along highly fragmented trajectories.

A further challenge concerns the conceptual fragmentation of existing scholarship. Systematic examinations of research from marketing, communication, and the social sciences show that metaverse studies remain dispersed across numerous topics, including consumer behavior, technological adoption, virtual identity, branding, digital commerce, governance, and communication (33). Much of the existing literature focuses on specific technologies, marketing practices, case studies, or immediate opportunities rather than examining how these developments

collectively transform the fundamental nature of commercial advertising. Studies often discuss virtual influencers, immersive branding, NFTs, programmatic advertising, neuromarketing, platform economics, or regulation separately, whereas future metaverse advertising is likely to emerge from the interaction of all of these dimensions. This fragmentation creates an important theoretical and practical gap: understanding individual technologies does not necessarily explain how the advertising institution itself may change when commercial communication becomes spatial, persistent, interactive, personalized, algorithmic, and embedded in the consumer's digital environment.

The distinction is particularly significant because advertising in the metaverse may cease to be a discrete communication event. Li's examination of advertising in the metaverse emphasizes the potential emergence of new promotional formats and modes of consumer engagement that differ from traditional digital advertising (34). At the same time, research on the broader transformation of metaverse marketing suggests that businesses may need to redesign how they create value, communicate with consumers, and structure interactions within immersive environments (30). The commercial significance of these environments therefore lies in convergence: communication converges with experience, advertising with entertainment, consumption with identity, data collection with interaction, and digital objects with economic value. Such convergence may ultimately require a reconceptualization of advertising as an environmental and relational phenomenon rather than a bounded persuasive message.

Futures studies provides an appropriate framework for examining this issue because the objective is not simply to predict a single technological outcome but to identify drivers, uncertainties, emerging patterns, possible discontinuities, opportunities, and risks that can shape alternative trajectories. The future of metaverse advertising will depend on whether immersive technologies become widely accessible, whether consumers accept persistent virtual environments, whether AI enables reliable adaptive interaction, whether regulators impose meaningful constraints on behavioral and biometric data, whether interoperable platforms emerge, and whether consumers maintain trust in increasingly automated commercial systems. At the same time, the future may be influenced by the commercialization of digital identity, the growth of creator economies, the expansion of virtual assets, and the development of new forms of platform power. Theoretical and empirical inquiry must therefore move beyond asking how advertising can be conducted in the metaverse and instead investigate what advertising may become under these conditions.

Accordingly, the present study aims to identify and futures-orient the emerging drivers, transformations, opportunities, risks, and critical uncertainties that are likely to shape the future nature of commercial advertising in the metaverse.

## 1. Methodology

This study employed an applied, exploratory futures-studies design with a qualitative orientation to identify and interpret the probable transformations in the nature of commercial advertising within the emerging metaverse environment. The futures-studies approach was selected because the metaverse represents a rapidly developing technological and socio-commercial ecosystem whose advertising structures, consumer interactions, business models, ethical boundaries, and communication mechanisms have not yet reached a stable or fully institutionalized form. Accordingly, rather than examining only existing advertising practices, the study sought to identify emerging drivers, uncertainties, potential developments, and plausible characteristics that may shape commercial advertising in future metaverse environments. The research population consisted of specialists and professionals residing or

working in Tehran who possessed relevant knowledge or professional experience in advertising, digital marketing, communication sciences, media studies, information technology, virtual and augmented reality, digital business, consumer behavior, and futures studies. Participants were selected through purposive sampling with an emphasis on expertise, professional experience, familiarity with emerging digital environments, and the ability to provide informed judgments concerning the future of advertising in immersive virtual spaces. To strengthen the diversity of perspectives, maximum-variation considerations were also applied so that participants represented academic, managerial, technological, marketing, and media-related backgrounds. A total of 24 experts from Tehran participated in the study. Eligibility criteria included having at least five years of relevant academic or professional experience, demonstrable familiarity with digital advertising or emerging technologies, and willingness to participate in an in-depth interview. Individuals whose professional background was not directly related to the research subject or whose responses did not provide sufficient analytical depth were excluded. Participant recruitment continued until theoretical and informational saturation was achieved, meaning that the final interviews generated no substantially new concepts regarding the future characteristics, drivers, opportunities, challenges, and structural transformations of commercial advertising in the metaverse. The study was conducted with attention to research ethics. Prior to data collection, the objectives and procedures of the study were explained to all participants, participation was voluntary, informed consent was obtained, and participants were assured that their identities and professional information would remain confidential. They were also informed of their right to withdraw from the research at any stage without any consequence.

Data were collected primarily through semi-structured, in-depth expert interviews designed specifically for the objectives of the study. The interview protocol was developed after reviewing the conceptual literature on commercial advertising, digital and interactive marketing, immersive media, virtual environments, augmented and virtual reality, artificial intelligence, digital consumer behavior, platform economies, and futures-studies approaches. Because the primary objective was to explore how the essential nature of advertising may change in metaverse environments, the interview questions were formulated to move beyond conventional questions about advertising effectiveness and to examine deeper transformations in the relationship among advertisers, consumers, platforms, virtual identities, digital objects, immersive experiences, and commercial communication. The interview guide therefore addressed issues such as the expected characteristics of advertising in the metaverse, the transition from exposure-based advertising to experiential and participatory advertising, the role of virtual and augmented reality technologies, personalization through artificial intelligence and behavioral data, the integration of commercial messages into virtual environments, the changing distinction between advertising and entertainment, the role of avatars and virtual influencers, consumer agency and interaction, new forms of brand experience, virtual ownership and digital goods, privacy and data governance, ethical concerns, technological infrastructure, and potential regulatory challenges. Participants were also asked to identify major driving forces, weak signals, emerging trends, critical uncertainties, opportunities, threats, and possible discontinuities capable of influencing the future development of commercial advertising in the metaverse. Open-ended questions were used so that experts could introduce issues beyond the initial conceptual framework, while probing questions were employed whenever clarification, elaboration, examples, or justification were required. Interviews were conducted individually and lasted approximately 45 to 75 minutes. With participants' permission, interviews were digitally recorded and subsequently transcribed verbatim to preserve the accuracy and richness of the qualitative data. Field notes were also recorded during and immediately after interviews to document contextual observations and preliminary analytical

interpretations. The content validity and comprehensibility of the interview protocol were reviewed by a small group of academic experts familiar with marketing, communication, emerging technologies, and futures studies before the main data-collection phase, and minor modifications were made to improve the clarity and sequence of the questions. Credibility of the qualitative evidence was further strengthened through prolonged engagement with the data, comparison of viewpoints across participants, member checking of key interpretations when clarification was necessary, and continuous comparison between newly collected information and previously identified concepts.

The collected data were analyzed through a combination of qualitative thematic analysis and futures-oriented structural interpretation. Immediately after completion of each interview, the transcript was reviewed several times to achieve immersion in the data and to identify meaningful statements related to the possible future nature of commercial advertising in the metaverse. In the initial coding stage, relevant statements were assigned descriptive and conceptual codes reflecting emerging phenomena such as immersive brand experience, hyper-personalized advertising, avatar-mediated communication, virtual product placement, interactive advertising, gamification, artificial intelligence-based targeting, biometric and behavioral data utilization, virtual influencers, consumer co-creation, commercialization of virtual spaces, digital ownership, privacy concerns, ethical ambiguity, platform power, and regulatory uncertainty. Similar codes were subsequently compared and integrated into broader subcategories and thematic categories. Constant comparison was used throughout the analytical process to identify similarities, differences, relationships, and emerging patterns across participants' accounts. Following the qualitative coding process, the identified themes were interpreted from a futures-studies perspective in order to distinguish relatively stable trends from emerging drivers and critical uncertainties. Particular attention was given to factors that could substantially alter the structure and meaning of advertising rather than merely modify existing advertising techniques. The analysis therefore examined the influence relationships among technological, economic, social, behavioral, legal, and ethical factors and considered how their interactions could reshape commercial communication within metaverse ecosystems. Drivers were assessed according to their perceived importance, influence, and degree of uncertainty, and those characterized by both high influence and substantial uncertainty were treated as strategically significant elements for understanding alternative futures of metaverse advertising. Analytical comparisons were repeatedly conducted between the original interview data and the emerging conceptual structure to ensure that the findings remained grounded in expert evidence rather than being imposed by predetermined assumptions. To enhance dependability, the coding framework and thematic classifications were reviewed and revised several times, and ambiguous codes were reconsidered in relation to their original interview contexts. Confirmability was strengthened by maintaining an analytical record of coding decisions and theme development, while transferability was supported through detailed description of participant expertise, the research context, and the analytical procedures. The final analytical framework was developed by integrating the identified themes, future drivers, opportunities, threats, and critical uncertainties into an interpretive account explaining how commercial advertising may evolve from a primarily message-oriented and media-placement activity into an immersive, interactive, personalized, data-driven, and experience-centered form of commercial communication within the metaverse.

## 2. Findings and Results

The participants consisted of 24 experts from Tehran with academic and professional backgrounds relevant to commercial advertising, digital marketing, communication and media studies, information technology, emerging

technologies, digital business, consumer behavior, and futures studies. Of the 24 participants, 14 were men and 10 were women. Their ages ranged from 31 to 58 years, with a mean age of 42.71 years. Regarding educational attainment, 4 participants held a master's degree and 20 held a doctoral degree or were university faculty members with doctoral-level qualifications. In terms of professional background, 7 participants were university professors or academic researchers in communication, media, marketing, or futures studies; 6 were digital marketing and advertising managers or consultants; 4 were specialists in information technology, artificial intelligence, virtual reality, or related emerging technologies; 4 were managers or entrepreneurs active in digital businesses and platform-based markets; and 3 had specialized experience in consumer behavior, branding, or strategic foresight. Participants had between 6 and 27 years of relevant professional experience, with a mean professional experience of 14.83 years. All participants reported direct familiarity with digital advertising environments, while 19 participants had previous professional or research exposure to immersive technologies, virtual platforms, artificial intelligence-based advertising, virtual reality, augmented reality, blockchain-based environments, or metaverse-related business models. Analysis of the interviews indicated that the participants did not perceive the metaverse merely as a new advertising channel. Rather, they consistently described it as an environment capable of changing the ontology of commercial advertising itself by transforming advertising from a discrete message delivered to an audience into a persistent, interactive, personalized, and commercially embedded experience in which consumers, brands, virtual objects, platforms, and algorithmic systems continuously interact.

**Table 1. Main Themes and Subthemes Characterizing the Future Nature of Commercial Advertising in the Metaverse**

| Main Theme | Subtheme | Description of the Future Transformation | Frequency of Participants Referring to the Subtheme |
|---|---|---|---|
| Transformation from Message to Immersive Experience | Experiential advertising | Advertising becomes an environment or experience that consumers enter and interact with rather than a message they merely view | 24 |
| Transformation from Message to Immersive Experience | Multisensory brand encounters | Virtual and augmented reality enable visual, auditory, spatial, and potentially haptic engagement with brands | 19 |
| Transformation from Message to Immersive Experience | Gamified commercial interaction | Advertising incorporates game mechanics, challenges, rewards, and virtual participation | 18 |
| Transformation from Message to Immersive Experience | Narrative participation | Consumers become active participants in branded stories rather than passive recipients of promotional narratives | 17 |
| Hyper-Personalization and Algorithmic Advertising | Real-time personalization | Advertising content changes dynamically according to users' behavior, preferences, context, and virtual activities | 23 |
| Hyper-Personalization and Algorithmic Advertising | AI-driven prediction | Artificial intelligence anticipates consumer needs and determines the timing, form, and content of commercial exposure | 22 |
| Hyper-Personalization and Algorithmic Advertising | Biometric and behavioral targeting | Eye movement, gestures, interaction patterns, emotional responses, and other behavioral signals become advertising data | 20 |
| Hyper-Personalization and Algorithmic Advertising | Adaptive virtual environments | Commercial spaces, products, and promotional stimuli are individually configured for different users | 18 |
| Integration of Advertising into Virtual Life | Embedded commercial presence | Advertising becomes integrated into virtual places, activities, entertainment, work, and social interaction | 23 |

| | | | |
|---|---|---|---|
| Integration of Advertising into Virtual Life | Disappearance of clear advertising boundaries | Distinctions among advertising, entertainment, social interaction, and virtual consumption become increasingly blurred | 21 |
| Integration of Advertising into Virtual Life | Persistent branding | Brands maintain continuous spatial and symbolic presence within virtual worlds | 18 |
| Integration of Advertising into Virtual Life | Virtual product placement | Branded virtual products and objects are incorporated naturally into digital environments | 17 |
| Transformation of Consumer Roles | Consumer co-creation | Users participate in designing, modifying, distributing, and promoting branded experiences | 21 |
| Transformation of Consumer Roles | Prosumer behavior | Consumers simultaneously become users, content creators, distributors, and commercial intermediaries | 19 |
| Transformation of Consumer Roles | Avatar-mediated consumption | Avatars become central objects of identity expression, product consumption, and brand affiliation | 18 |
| Transformation of Consumer Roles | Social influence within virtual communities | Peer interaction, virtual communities, and social validation increasingly affect advertising outcomes | 17 |
| New Forms of Brand Identity and Representation | Virtual influencers and artificial agents | Brands employ AI-generated personalities, virtual influencers, and autonomous conversational agents | 20 |
| New Forms of Brand Identity and Representation | Avatar-based brand identity | Brands construct avatars, virtual employees, and interactive representatives | 17 |
| New Forms of Brand Identity and Representation | Persistent virtual brand worlds | Brands develop permanent virtual environments rather than temporary advertising campaigns | 16 |
| New Forms of Brand Identity and Representation | Dynamic identity construction | Brand identity becomes flexible and continuously modified according to user interactions | 15 |
| Commercialization of Digital Objects and Ownership | Virtual goods and assets | Commercial advertising increasingly promotes non-physical goods, avatar accessories, and virtual experiences | 21 |
| Commercialization of Digital Objects and Ownership | Digital ownership | Ownership of virtual objects becomes a central component of advertising and consumer value | 18 |
| Commercialization of Digital Objects and Ownership | Hybrid physical-virtual consumption | Advertising connects virtual experiences to physical products and services | 19 |
| Commercialization of Digital Objects and Ownership | Tokenized commercial relationships | Digital assets and blockchain-based mechanisms may support loyalty, access, and transactional advertising models | 14 |
| Datafication and Surveillance Expansion | Continuous behavioral data collection | User activities generate extensive commercial data throughout virtual participation | 23 |
| Datafication and Surveillance Expansion | Emotional and cognitive inference | Advertising systems may infer attention, emotion, interest, and intention from user behavior | 20 |
| Datafication and Surveillance Expansion | Surveillance-based personalization | Increased personalization is accompanied by greater monitoring of users | 20 |
| Datafication and Surveillance Expansion | Platform-controlled consumer profiles | Major metaverse platforms may control extensive commercial profiles of individual users | 18 |
| Ethical and Regulatory Reconfiguration | Privacy and informed consent | Existing forms of consent may become inadequate for immersive and continuous data collection | 22 |
| Ethical and Regulatory Reconfiguration | Manipulative advertising risks | Immersion and personalization may increase the capacity of advertising to influence users below conscious awareness | 20 |

| | | | |
|---|---|---|---|
| Ethical and Regulatory Reconfiguration | Protection of vulnerable users | Children and psychologically or economically vulnerable consumers require stronger protections | 19 |
| Ethical and Regulatory Reconfiguration | Unclear jurisdiction and regulation | Cross-border virtual environments make regulatory responsibility and enforcement difficult | 18 |
| Platformization and New Commercial Power Structures | Platform dominance | Metaverse platform owners may become powerful intermediaries controlling advertising access and data | 22 |
| Platformization and New Commercial Power Structures | Algorithmic gatekeeping | Algorithms determine which brands, products, and commercial experiences become visible | 19 |
| Platformization and New Commercial Power Structures | New advertising intermediaries | Developers, virtual-world designers, AI providers, and data firms become important advertising actors | 18 |
| Platformization and New Commercial Power Structures | Dependence on technological ecosystems | Advertising effectiveness becomes increasingly dependent on platform architecture and interoperability | 17 |

As shown in Table 1, seven overarching themes and 36 subthemes were extracted from the expert interviews. The most prominent finding was the anticipated transformation of advertising from a message-centered communication process into an immersive commercial experience. All 24 participants referred to experiential advertising, indicating a strong consensus that future metaverse advertising would no longer be adequately described through traditional concepts such as exposure, placement, repetition, or message reception. Instead, participants envisioned consumers entering branded spaces, interacting with virtual products, participating in commercial narratives, and experiencing brands through embodied or simulated activities. The second highly prominent theme concerned hyper-personalization and algorithmic advertising. Twenty-three participants emphasized real-time personalization, while 22 identified artificial intelligence-based prediction as a major feature of future advertising. These findings suggest that advertising in the metaverse may evolve from segment-based targeting toward individually adaptive commercial environments in which promotional content, virtual objects, product recommendations, spatial arrangements, and even the behavior of artificial agents are continuously modified according to each user's profile and behavior. A similarly high level of emphasis was placed on the integration of advertising into virtual life, particularly embedded commercial presence and the progressive disappearance of clear boundaries between advertising and other activities. Participants explained that advertisements may become inseparable from games, social spaces, work environments, entertainment, education, and interpersonal interaction. The findings also indicated that consumers are likely to assume more active roles through co-creation, avatar-mediated consumption, and participation in virtual communities. At the same time, the increasing commercialization of virtual goods and identities was perceived as expanding the object of advertising beyond physical products toward digital assets, avatar-related products, virtual services, branded experiences, and hybrid physical-virtual offerings. However, participants consistently associated these opportunities with intensified datafication. Twenty-three experts highlighted continuous behavioral data collection and 20 referred to emotional or cognitive inference and surveillance-based personalization. Consequently, ethical and regulatory concerns emerged as constitutive dimensions of the future nature of advertising rather than secondary issues. Overall, Table 1 demonstrates that the anticipated future of commercial advertising in the metaverse is characterized by immersion, personalization, integration, participatory consumption, virtualization of goods and identities, intensified data extraction, and increasing platform control.

**Table 2. Key Drivers Shaping the Future of Commercial Advertising in the Metaverse**

| Future Driver | Domain | Mean Importance Score | Mean Uncertainty Score | Strategic Status |
|---|---|---|---|---|
| Development of artificial intelligence and generative AI | Technological | 4.83 | 3.71 | High-impact driver |
| Expansion of virtual and augmented reality technologies | Technological | 4.79 | 3.46 | High-impact driver |
| Consumer adoption of metaverse environments | Social/Behavioral | 4.75 | 4.42 | Critical uncertainty |
| Regulation of privacy and behavioral data | Legal/Regulatory | 4.71 | 4.33 | Critical uncertainty |
| Integration of physical and virtual commerce | Economic/Technological | 4.67 | 3.63 | High-impact driver |
| Development of immersive interfaces and wearable devices | Technological | 4.63 | 3.88 | High-impact driver |
| Trust in metaverse platforms and brands | Social/Behavioral | 4.58 | 4.21 | Critical uncertainty |
| Platform governance and concentration of market power | Economic/Institutional | 4.54 | 4.08 | Critical uncertainty |
| Availability and affordability of immersive technologies | Economic/Technological | 4.50 | 3.96 | Emerging uncertainty |
| Use of biometric and emotional data in advertising | Technological/Ethical | 4.46 | 4.29 | Critical uncertainty |
| Growth of virtual goods and digital ownership | Economic | 4.42 | 3.83 | High-impact driver |
| Expansion of virtual influencers and AI agents | Media/Technological | 4.38 | 3.67 | Emerging driver |
| Interoperability among metaverse platforms | Technological/Institutional | 4.33 | 4.13 | Critical uncertainty |
| Consumer demand for personalized brand experiences | Behavioral/Marketing | 4.29 | 3.25 | Relatively predictable driver |
| Emergence of new legal frameworks for virtual advertising | Legal | 4.25 | 4.38 | Critical uncertainty |
| Public concern regarding surveillance and manipulation | Social/Ethical | 4.21 | 4.04 | Critical uncertainty |
| Expansion of blockchain and tokenized transactions | Technological/Economic | 3.96 | 4.17 | Emerging uncertainty |
| Development of virtual labor and creator economies | Economic/Social | 3.92 | 3.79 | Emerging driver |

Table 2 presents the major drivers identified as shaping the future trajectory of commercial advertising in metaverse environments. Experts evaluated the drivers in terms of their anticipated importance and uncertainty using a five-point interpretive scale after the qualitative extraction of factors. Artificial intelligence and generative AI received the highest mean importance score of 4.83, followed by the expansion of virtual and augmented reality technologies with a mean of 4.79. These drivers were considered highly influential because they directly determine the ability of advertisers to create adaptive, interactive, automated, and immersive commercial experiences. Consumer adoption of metaverse environments received an importance score of 4.75 and an uncertainty score of 4.42, making it one of the most important critical uncertainties. Experts repeatedly emphasized that technological possibility alone would not guarantee the emergence of a mature advertising ecosystem; the future of metaverse advertising would also depend on whether large numbers of consumers accept immersive environments as meaningful spaces for communication, entertainment, work, social interaction, and consumption. Regulation of privacy and behavioral data was another highly influential uncertainty, with a mean importance score of 4.71 and an uncertainty score of 4.33. This factor was considered particularly important because the commercial value of metaverse advertising is expected to depend heavily on continuous behavioral and potentially biometric data, while stronger privacy legislation could substantially restrict the collection or commercialization of such data. Trust in

metaverse platforms, platform governance, biometric-data use, interoperability, and the development of legal frameworks also combined high importance with high uncertainty and were therefore classified as critical uncertainties. The findings show that the future of metaverse advertising is not determined by a single technological trajectory. Instead, it will emerge from interactions among technological capability, consumer adoption, regulatory intervention, market concentration, social legitimacy, infrastructure costs, and ethical acceptability. The comparatively lower uncertainty associated with demand for personalized brand experiences indicates that personalization itself was regarded as a relatively predictable direction, whereas the extent to which personalization can legitimately rely on intimate behavioral or biometric information remains highly uncertain.

**Table 3. Major Opportunities and Threats Associated with Commercial Advertising in the Metaverse**

| Dimension | Opportunity | Corresponding Threat or Risk | Frequency of Participants Identifying the Issue |
|---|---|---|---|
| Consumer Experience | Creation of highly immersive and memorable brand experiences | Psychological overload and excessive commercial stimulation | 23 |
| Personalization | Precise adaptation of advertisements to individual preferences | Invasive surveillance and loss of privacy | 23 |
| Consumer Engagement | Active participation and interaction with brands | Manipulation through immersive persuasion mechanisms | 21 |
| Brand Relationships | Development of long-term virtual brand communities | Increased dependence on private commercial ecosystems | 19 |
| Product Visualization | Trial and simulation of products before purchase | Distortion of consumer perception through unrealistic simulations | 18 |
| Market Expansion | Access to global audiences independent of physical location | Increased international regulatory and jurisdictional complexity | 18 |
| Data Analytics | Rich behavioral information for understanding consumers | Commercial exploitation of sensitive biometric and emotional data | 21 |
| Creative Advertising | New storytelling, gamification, and interactive formats | Blurring of boundaries between advertising and entertainment | 20 |
| Virtual Goods | Emergence of new markets for digital products and services | Speculation, unstable value, and uncertain ownership rights | 17 |
| Artificial Intelligence | Automated creation and optimization of advertising content | Algorithmic bias, opacity, and reduced human accountability | 20 |
| Virtual Influencers | Scalable and controllable brand representatives | Authenticity problems and deceptive representation | 17 |
| Consumer Co-Creation | Collaborative brand development and user-generated promotion | Exploitation of unpaid user labor and commercial participation | 16 |
| Hybrid Commerce | Integration of physical products with virtual experiences | Increased complexity of transactions and consumer protection | 18 |
| Accessibility | Participation beyond geographical constraints | Digital exclusion caused by technological costs and digital literacy gaps | 17 |
| Measurement | More precise assessment of attention and interaction | Excessive tracking and behavioral profiling | 19 |
| Platform Ecosystems | Efficient distribution of advertising within integrated environments | Monopoly power and dependence on dominant platform providers | 20 |
| Social Commerce | Purchasing integrated into virtual social interaction | Increased impulse consumption and social pressure | 18 |
| Regulatory Innovation | Development of new standards for digital advertising transparency | Delayed regulation relative to rapid technological development | 19 |

The results presented in Table 3 indicate that nearly every major opportunity created by metaverse advertising is accompanied by a corresponding structural or ethical risk. The most frequently identified opportunity was the creation of immersive and memorable brand experiences, mentioned by 23 participants. Experts believed that virtual and augmented environments could substantially improve the experiential dimension of branding by allowing consumers to interact with products, visit simulated commercial spaces, participate in branded events, or

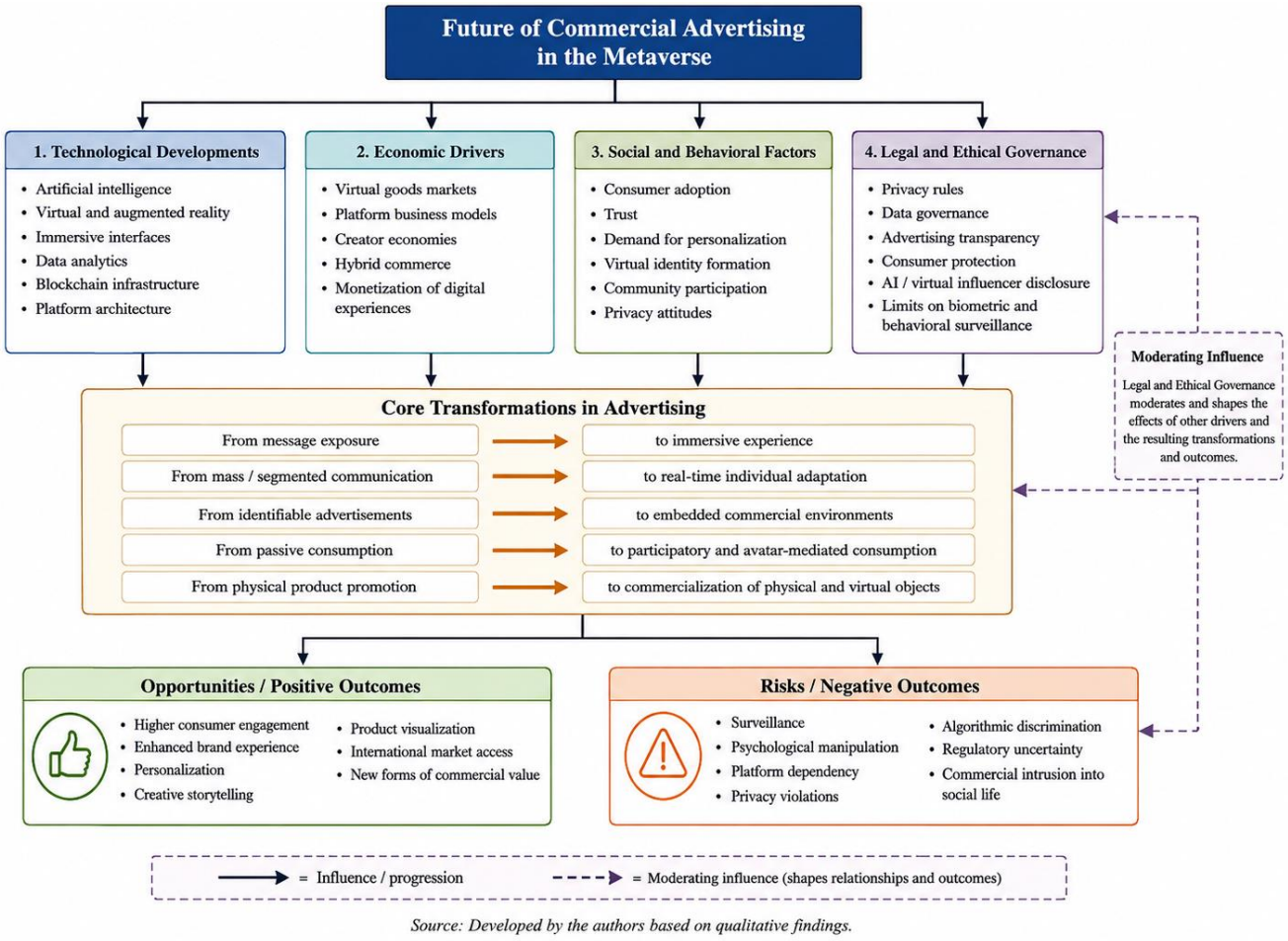
experience services before making a purchase. Nevertheless, the same technological capacities were perceived as capable of creating psychological overload and persistent commercial exposure. Personalization was likewise identified by 23 participants as a major opportunity, particularly because metaverse platforms could adapt commercial experiences to the individual user's interests, location within a virtual environment, interaction history, social networks, and behavioral signals. However, experts strongly associated this development with invasive surveillance and the erosion of informational privacy. Another major tension concerned consumer engagement. Interactive advertisements could improve involvement and strengthen consumer-brand relationships, yet immersive persuasion could become more difficult for users to recognize or resist than conventional advertising. Participants were particularly concerned that advertising could be embedded so naturally within virtual environments that users might not clearly distinguish commercial persuasion from entertainment, social interaction, or ordinary environmental design. Similar dualities appeared in relation to artificial intelligence, virtual influencers, digital products, social commerce, and platform ecosystems. AI was seen as capable of reducing production costs and enabling continuous optimization of advertisements, while simultaneously raising concerns regarding algorithmic bias, opacity, and responsibility. Platform ecosystems could provide advertisers with efficient access to integrated audiences and commercial infrastructure, but could also concentrate control over consumer data and advertising visibility in a small number of technology companies. Thus, the findings indicate that the future value of metaverse advertising is likely to depend not merely on technological innovation but on the ability of organizations and regulators to manage the trade-offs between immersion and autonomy, personalization and privacy, commercial innovation and consumer protection, and platform efficiency and market power.

**Table 4. Alternative Future Scenarios for Commercial Advertising in the Metaverse**

| Scenario | Level of Consumer Adoption | Strength of Regulation and Ethical Governance | Dominant Characteristics of Advertising | Expected Consequences |
|---|---|---|---|---|
| Immersive Responsible Ecosystem | High | High | Personalized, immersive, transparent, consent-based, interactive, ethically governed | High consumer trust, sustainable brand engagement, controlled data use, strong innovation |
| Hyper-Commercialized Metaverse | High | Low | Persistent advertising, intensive behavioral targeting, biometric personalization, platform-controlled commercial environments | Rapid market growth accompanied by surveillance, manipulation, privacy erosion, and platform dominance |
| Regulated but Fragmented Metaverse | Moderate | High | Restricted targeting, stronger consumer protection, limited data use, platform-specific advertising ecosystems | Greater protection but slower innovation, reduced personalization, fragmented commercial standards |
| Limited-Adoption Virtual Market | Low | Variable | Niche immersive campaigns, experimental virtual branding, limited commercial integration | Restricted advertising investment, slow development, concentration in gaming and specialized virtual communities |

Table 4 summarizes four plausible future scenarios derived from the interaction between two critical uncertainties that emerged consistently across the interviews: the degree of consumer adoption of metaverse environments and the strength of regulatory and ethical governance. The first scenario, the Immersive Responsible Ecosystem, represents a future in which widespread consumer adoption is accompanied by effective governance, transparent data practices, meaningful informed consent, and enforceable advertising standards. Under this scenario, advertising would become highly immersive and personalized, but commercial organizations would be required to establish clear boundaries between promotional and non-promotional content, disclose the use of artificial agents

and virtual influencers, and limit the exploitation of sensitive behavioral and biometric data. Participants regarded this scenario as the most socially sustainable because innovation and consumer trust could reinforce one another. The second scenario, the Hyper-Commercialized Metaverse, reflects high consumer adoption combined with weak governance. In this future, metaverse advertising could expand rapidly through continuous tracking, hyper-personalized offers, algorithmic persuasion, virtual product placement, and persistent brand environments. Although this scenario could generate considerable commercial value, participants considered it particularly vulnerable to surveillance, manipulation, privacy violations, monopolistic platform power, and declining consumer autonomy. The third scenario, the Regulated but Fragmented Metaverse, combines relatively strong governance with only moderate adoption. Advertising in this scenario would be more restricted and transparent, but regulatory variation and technological fragmentation could reduce interoperability and limit innovation. The fourth scenario, the Limited-Adoption Virtual Market, represents a future in which the metaverse remains a specialized rather than mainstream environment. Under such circumstances, commercial advertising would continue to exist primarily in gaming, entertainment, specialized virtual communities, and experimental brand environments without fundamentally replacing conventional digital advertising. Collectively, the four scenarios demonstrate that the future nature of metaverse advertising is conditional rather than predetermined. The same technological capabilities may lead either to a trusted and participatory commercial ecosystem or to a highly intrusive advertising environment depending on consumer acceptance, regulatory design, platform governance, and social responses to data-intensive personalization.




*Source: Developed by the authors based on qualitative findings.*

**Figure 1. Conceptual Futures Framework of the Transformation of Commercial Advertising in the Metaverse**

The conceptual framework summarized in Figure 1 synthesizes the relationships identified across the qualitative and futures-oriented analyses. At the foundational level, technological developments in artificial intelligence, virtual and augmented reality, immersive interfaces, data analytics, blockchain-based infrastructures, and platform architecture create the technical conditions through which metaverse advertising can evolve. These technological developments interact with economic drivers such as virtual goods markets, platform business models, creator economies, hybrid commerce, and the increasing monetization of digital experiences. At the same time, social and behavioral factors, particularly consumer adoption, trust, demand for personalization, virtual identity formation, community participation, and attitudes toward privacy, determine the extent to which technological possibilities become commercially viable practices. Legal and ethical governance operates as a moderating layer that can either constrain or legitimize the use of behavioral data, biometric information, artificial agents, virtual influencers, and embedded advertising practices. The interaction of these forces generates several central transformations in the nature of commercial advertising: the movement from message exposure toward immersive experience, from mass or segmented communication toward real-time individual adaptation, from identifiable advertisements toward embedded commercial environments, from passive consumption toward participatory and avatar-mediated consumption, and from physical product promotion toward the commercialization of both physical and virtual objects. These transformations, in turn, generate competing outcomes. On the positive side, the metaverse may increase consumer engagement, brand experience, personalization, creativity, product visualization, international market access, and new forms of commercial value. On the negative side, it may intensify surveillance, psychological manipulation, platform dependency, privacy violations, algorithmic discrimination, regulatory uncertainty, and commercial intrusion into social life. The framework therefore indicates that the defining characteristic of future metaverse advertising is not simply increased technological sophistication. Rather, its future nature will emerge from the dynamic interaction among immersion, personalization, datafication, platformization, consumer participation, and governance. The findings ultimately suggest that commercial advertising in the metaverse should be conceptualized as a continuously adaptive commercial environment in which advertising, consumption, identity, social interaction, entertainment, and data production increasingly converge.

Taken together, the findings demonstrate that the anticipated transformation of commercial advertising in the metaverse is multidimensional and structural. Participants consistently rejected the assumption that the metaverse would merely provide advertisers with an additional digital medium comparable to social media, websites, or mobile applications. Instead, they anticipated a fundamental reconfiguration of commercial communication in which the traditional boundaries among medium, advertisement, marketplace, product, consumer, and social environment become less distinct. The advertising object itself may shift from a bounded promotional message toward an interactive environment, virtual object, avatar, artificial agent, game, event, community, or personalized sequence of experiences. Simultaneously, consumers may cease to function solely as target audiences and increasingly become co-creators, distributors, virtual consumers, data producers, and participants in branded environments. This transformation is expected to increase the strategic importance of artificial intelligence, immersive technologies, virtual identity, behavioral data, and platform governance. However, the results also show that the future is highly contingent. The extent to which metaverse advertising becomes accepted and sustainable will

depend heavily on consumer trust, accessibility of immersive technologies, regulatory responses, interoperability among virtual environments, and the ability to establish ethical limits on behavioral and biometric surveillance. Consequently, the central futures-oriented finding of the study is that the commercial promise of the metaverse and its ethical risks arise from the same underlying technological capacities. Immersion can create valuable experiences but can also increase persuasive intensity; personalization can enhance relevance but can also produce invasive surveillance; social interaction can facilitate community-based branding but can also commercialize interpersonal relationships; and platform integration can increase convenience while simultaneously concentrating market and informational power. These interdependencies constitute the principal strategic challenge that will shape the future nature of commercial advertising in the metaverse.

## 3. Discussion and Conclusion

The present study examined the future nature of commercial advertising in the metaverse and identified a multidimensional transformation characterized by immersion, hyper-personalization, integration of advertising into virtual life, changing consumer roles, new forms of brand representation, commercialization of digital objects, intensified datafication, and growing platform and regulatory influence. The findings indicated that experts do not view the metaverse merely as an additional digital advertising channel; rather, they anticipate a structural transformation in which advertising increasingly becomes an interactive environment, a persistent experience, and a component of virtual identity and social participation. The results further showed that artificial intelligence, virtual and augmented reality, consumer adoption, privacy regulation, trust, platform governance, and the use of biometric and behavioral data are among the most influential forces shaping this transformation. At the same time, the identified opportunities—such as enhanced engagement, richer brand experiences, personalization, global reach, and new forms of commercial value—were consistently accompanied by risks including surveillance, manipulation, privacy loss, platform dependency, regulatory uncertainty, and blurred boundaries between commercial and non-commercial experiences. These findings support the argument that the future of commercial advertising in the metaverse should be understood not as a linear technological progression but as a contingent socio-technical transformation shaped by the interaction of technological innovation, consumer behavior, economic incentives, platform structures, and ethical governance.

One of the most important findings was the shift from message-centered advertising toward immersive and experiential commercial communication. All participants emphasized that future metaverse advertising is likely to move beyond conventional exposure to advertisements and toward experiences in which consumers enter branded environments, interact with virtual products, participate in narratives, and engage with firms through embodied or avatar-mediated activities. This finding is strongly aligned with previous literature that describes the metaverse as a qualitatively different marketing environment rather than a simple extension of conventional digital media. Kadry argued that the metaverse has the potential to revolutionize advertising through interactive and immersive forms of communication that transform the relationship between brands and audiences (5). Similarly, Singh described the metaverse as an emerging digital marketing trend capable of creating novel forms of consumer engagement beyond established online promotional practices (3). Research on digital marketing in metaverse environments also suggests that virtual spaces provide marketers with new possibilities for experiential engagement, participatory branding, and interactive forms of communication (4). The present findings extend these arguments by suggesting that immersion is not simply an additional advertising technique but may become a defining characteristic of

advertising itself. In other words, commercial persuasion may increasingly be embedded in the architecture and experience of virtual environments rather than appearing as a separate communicative unit.

The findings concerning immersive brand experience are also consistent with studies emphasizing the experiential potential of virtual environments. Fakhry and Nasr demonstrated that metaverse technologies can enhance fashion brand experiences by allowing consumers to interact with digital products and brand identities through virtual environments (6). In the hospitality sector, Bilgihan and Ricci similarly showed that emerging technologies can be integrated with core marketing principles to create richer, more interactive, and personalized consumer experiences (7). These studies support the present finding that metaverse advertising may increasingly operate through experiential rather than solely representational mechanisms. When consumers can enter a virtual store, manipulate a digital object, attend a branded event, or use an avatar to experience a product, advertising becomes integrated with product trial, entertainment, social interaction, and consumption. This convergence may increase engagement and memorability, but it also makes commercial influence less visibly separable from the surrounding environment.

A second major finding concerned hyper-personalization and algorithmic adaptation. Participants identified artificial intelligence and generative AI as the most important future driver, while real-time personalization and AI-based prediction emerged as central characteristics of future metaverse advertising. This finding aligns with Nalbant and Aydın, who argued that artificial intelligence and digital technologies are transforming digital marketing and branding within the metaverse by enabling more adaptive and individualized interactions (14). Sadek likewise emphasized the importance of automation and programmatic advertising in metaverse contexts, where advertising decisions can increasingly be made algorithmically and dynamically (15). The present results suggest that this development may exceed the personalization currently observed in social media or web advertising. In immersive environments, personalization may affect not only which advertisement a user sees but also the appearance of the surrounding commercial environment, the behavior of virtual agents, product recommendations, spatial arrangements, and the timing and intensity of persuasive stimuli. Thus, the future trajectory may involve a movement from personalized messages toward personalized commercial realities.

This interpretation is further supported by research on advertising appeals and neuromarketing. Yaman and colleagues demonstrated the importance of prioritizing advertising appeals specifically for metaverse environments, suggesting that the effectiveness of persuasive strategies may depend on how they are adapted to immersive contexts (16). Morales and colleagues similarly proposed metaverse neuromarketing as a potential source of competitive advantage because immersive platforms can generate richer information about attention, emotional response, and consumer behavior (17). These studies align closely with the present finding that behavioral and biometric data could become central resources for future advertising systems. The capacity to monitor gaze, movement, interaction patterns, emotional reactions, or other behavioral signals could allow advertising systems to infer consumer states and adapt commercial experiences accordingly. However, this same capability also intensifies ethical concerns because the more accurately commercial systems can predict and influence behavior, the greater the risk that personalization becomes intrusive or manipulative.

The findings regarding the integration of advertising into virtual life and the disappearance of clear advertising boundaries represent another important contribution. Participants anticipated that advertising would increasingly be embedded within entertainment, gaming, social interaction, work, and virtual consumption. This finding corresponds with Huckle and colleagues' analysis of immersive alcohol marketing and commerce, which showed that metaverse

environments can combine promotional activity, social experience, commerce, and digital interaction in new ways (19). Amironesei's quasi-legal analysis likewise emphasizes that metaverse advertising challenges conventional assumptions regarding the identification and regulation of commercial content (21). When a branded virtual environment simultaneously functions as entertainment, social space, and marketplace, the boundary between persuasion and ordinary participation becomes increasingly difficult to identify. The results therefore suggest that future regulatory frameworks may need to move beyond conventional disclosure mechanisms and address the architecture of immersive commercial environments themselves.

The changing role of consumers was another central theme. Participants described future users as co-creators, prosumers, avatar-mediated consumers, and members of commercial communities rather than passive audiences. This finding is consistent with the growing literature on virtual consumption, digital identity, and creator economies. KiliÇAslan and colleagues argued that the metaverse economy may foster new forms of consumption culture in which identity and participation are increasingly expressed through virtual goods and digital environments (10). Madanchian and Taherdoost similarly showed that NFTs and metaverse technologies can contribute to the evolution of business models by introducing new forms of digital ownership and value creation (8). The present findings suggest that this transformation may also affect the logic of advertising. Consumers may not only receive or respond to branded content but participate in producing it, modifying virtual objects, creating branded experiences, and distributing commercial meaning through social networks and avatar-based interaction.

The importance of virtual influencers and artificial agents found in this study also aligns with existing evidence. Wibawa and colleagues examined the perceived trustworthiness of virtual influencers and showed that virtual personas can function as meaningful actors in digital communication and endorsement (11). Karabacak and Güngör further demonstrated how influencer-brand collaborations are already extending into metaverse-related environments (12). Chen's work on virtual anchors similarly indicates that synthetic or digitally mediated personalities may play increasing roles in future broadcasting and communication (13). Together, these studies support the present finding that brand representation may become increasingly autonomous, artificial, and persistent. Future consumers may interact with virtual brand agents that are available continuously, adapt to individual users, and combine promotional, informational, entertainment, and service functions. This could increase scalability and engagement while simultaneously raising concerns regarding authenticity, disclosure, accountability, and the psychological effects of interacting with persuasive artificial entities.

The commercialization of virtual goods and hybrid physical-virtual consumption was also prominent in the findings. Participants anticipated that advertising would increasingly promote not only physical goods but digital products, avatar accessories, virtual experiences, and hybrid offerings. This result is consistent with Madanchian and Taherdoost's discussion of evolving business models associated with NFTs and metaverse environments (8). Golmgrein also emphasized the diversification of monetization strategies in creative industries, including mechanisms associated with digital content and virtual value creation (25). Dutta and Singh further described how fintech development in metaverse contexts may reshape consumer behavior by integrating digital transactions, financial technologies, and emerging forms of consumption (26). The present findings indicate that these economic developments have direct implications for advertising because the boundaries among advertising, product, payment mechanism, and ownership may increasingly converge. A branded virtual object may simultaneously function as a product, an identity marker, an advertisement, and a social signal.

The findings regarding brand expansion into persistent virtual environments also align with existing corporate cases. The experience of Nike illustrates how established brands have begun experimenting with virtual products and metaverse-related commercial strategies (27). Yang similarly highlighted the importance of evolving marketing strategies in Nike's competitive positioning, including the growing significance of digital innovation (28). These examples support the participants' expectation that firms may increasingly create permanent virtual brand worlds rather than relying solely on short-term advertising campaigns. This represents a significant strategic shift because advertising may become spatial and persistent: consumers may repeatedly return to branded environments, develop social relationships within them, and integrate branded digital assets into their identities.

At the same time, the present study identified extensive concerns regarding surveillance, privacy, and datafication. Continuous behavioral data collection and emotional or cognitive inference were among the most frequently reported risks. This finding strongly corresponds with McStay's analysis of the metaverse as a potentially surveillant environment in which users' embodied, affective, and behavioral experiences may become subject to unprecedented levels of monitoring (18). The implications are substantial because metaverse advertising may rely on data that are considerably more intimate than the information typically collected through conventional websites. If headsets, wearables, sensors, and immersive interfaces can capture movements, attention, gaze, vocal patterns, physiological signals, and social interactions, advertisers may gain access to data capable of revealing highly sensitive dimensions of user behavior. The present results therefore suggest that data governance is not merely a secondary compliance issue but one of the central determinants of whether future metaverse advertising develops in a socially legitimate and sustainable manner.

The participants' concerns regarding ethical governance are also supported by existing legal and regulatory scholarship. Amironesei highlighted the legal ambiguities surrounding advertising in the metaverse, including questions of responsibility, jurisdiction, and consumer protection (21). Vig emphasized that intellectual property law will face significant challenges in virtual environments where digital assets can be reproduced, transferred, modified, and commercialized (22). Yayman demonstrated that virtual-world transactions may also create complex taxation issues across different legal systems (23), while Muravskyi and colleagues emphasized the need for new approaches to accounting and auditing electronic transactions in metaverse environments (24). These studies support the present conclusion that advertising cannot be separated from the broader institutional architecture of virtual economies. Questions of ownership, payment, taxation, disclosure, privacy, and jurisdiction will directly shape which advertising practices are permissible and economically sustainable.

The four scenarios developed in the present study further demonstrate the conditional nature of the future. The Immersive Responsible Ecosystem represents a high-adoption, high-governance future in which innovation is supported by transparency, consent, and consumer protection. By contrast, the Hyper-Commercialized Metaverse combines high adoption with weak governance and therefore maximizes both commercial opportunity and the risks of surveillance, manipulation, and platform dominance. The Regulated but Fragmented Metaverse suggests that strong regulation without full technological or market integration could protect consumers while limiting interoperability and innovation, whereas the Limited-Adoption Virtual Market represents a future in which metaverse advertising remains concentrated in specialized niches. These scenarios are consistent with Kshetri and colleagues' observation that the trajectory of the metaverse has already been characterized by significant fluctuation in expectations and adoption (29). They are also compatible with Vig's argument that businesses must prepare strategically for a new paradigm while recognizing uncertainty regarding the speed and scale of metaverse

development (30). The present findings therefore reinforce the value of a futures-oriented approach: the future of advertising in the metaverse is unlikely to follow a single predetermined path.

Consumer adoption and trust emerged as especially important uncertainties. The importance of these factors is supported by Jo and Shin, who found that attitudes toward the metaverse and NFTs are related to viewer engagement in esports contexts (31). This suggests that the commercial viability of immersive environments will depend not only on technological capability but on users' motivations, perceptions, and willingness to participate. Similarly, Pellegrino and colleagues' review of sustainable consumption in the metaverse emphasizes the need to understand how virtual consumption interacts with consumer values and broader social outcomes (32). The present findings extend this perspective by showing that trust may act as a central mediating condition between technological sophistication and commercial adoption. Highly immersive and personalized advertising may be technically feasible, but if users perceive it as intrusive, manipulative, or unsafe, the same capabilities may undermine participation.

Finally, the results support the broader conclusion that existing scholarship remains conceptually fragmented and that the future nature of advertising requires an integrative perspective. Crespo-Pereira and colleagues showed that metaverse research in marketing, communication, and the social sciences spans multiple topics and remains characterized by significant conceptual and empirical gaps (33). Li similarly emphasized that advertising in the metaverse introduces new forms of communication and promotional engagement that require further theoretical development (34). The present study contributes to this emerging literature by integrating technological, economic, behavioral, legal, and ethical dimensions into a single futures framework. Rather than treating AI, virtual influencers, virtual goods, immersive experiences, consumer data, or platform governance as separate issues, the findings show that these elements interact to transform the ontology of commercial advertising itself. The central implication is that future advertising may become less recognizable as a discrete message and increasingly operate as a continuously adaptive commercial environment in which communication, consumption, identity, social interaction, and data production converge.

This study has several limitations that should be considered when interpreting its findings. First, the participants were 24 experts selected purposively from Tehran, and although their backgrounds covered advertising, marketing, communication, technology, business, consumer behavior, and futures studies, their perspectives may not represent all relevant professional, cultural, or geographical contexts. Second, the study relied on expert judgments regarding a rapidly evolving technological phenomenon; therefore, the findings reflect informed perceptions of plausible futures rather than predictions that can be treated as certain outcomes. Third, the metaverse itself remains technologically and conceptually unstable, and changes in hardware, artificial intelligence, platform strategies, regulation, consumer adoption, or economic conditions may alter the relative importance of the drivers identified in this study. Fourth, the qualitative and scenario-oriented design emphasized interpretive depth rather than statistical generalizability, and the importance and uncertainty assessments were based on the judgments of the participating experts. Finally, because many metaverse advertising practices are still experimental, some anticipated opportunities and risks could not be evaluated against long-term behavioral or market evidence.

Future studies should expand the empirical scope of this topic by recruiting experts, consumers, advertisers, regulators, technology developers, and platform managers from different cities and countries and comparing how cultural, regulatory, and economic contexts influence expectations about metaverse advertising. Longitudinal research would be particularly useful for examining whether the drivers and critical uncertainties identified in this

study change as immersive technologies become more mature and widely adopted. Quantitative studies could develop measurement instruments based on the themes identified here and test relationships among perceived immersion, personalization, trust, privacy concerns, advertising recognition, engagement, and purchase behavior. Experimental research should examine how consumers respond to different levels of immersion, avatar-based persuasion, virtual influencers, biometric personalization, and embedded advertising. Future scenario studies could also use Delphi techniques, cross-impact analysis, structural modeling, or morphological analysis to refine alternative futures and estimate their relative plausibility. Additional attention should be given to children, adolescents, vulnerable consumers, cross-cultural differences, sustainable consumption, algorithmic discrimination, and the psychological effects of prolonged exposure to immersive commercial environments.

Advertising agencies, brands, platform developers, and policymakers should treat metaverse advertising as a new commercial environment rather than simply transferring existing digital advertising practices into virtual spaces. Organizations should prioritize transparent design, meaningful consent, data minimization, and clear disclosure of commercial intent, particularly when artificial agents, virtual influencers, biometric information, or behavioral profiling are involved. Brands should develop immersive experiences that provide genuine consumer value rather than relying on excessive stimulation or hidden persuasion, and they should establish internal ethical standards before deploying highly personalized or adaptive advertising systems. Platform providers should create technical mechanisms that allow users to control data collection, personalization intensity, and exposure to commercial content. Regulators should develop flexible but enforceable standards capable of addressing embedded advertising, cross-border virtual transactions, digital ownership, and the commercial use of behavioral and biometric data. Finally, organizations should use scenario planning continuously so that marketing strategies remain adaptable to changes in consumer adoption, regulation, interoperability, platform concentration, and public trust.

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## Authors' Contributions

All authors equally contributed to this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

All ethical principles were adheried in conducting and writing this article.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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