

The Rise of Virtual Influencers: A Business 5.0 Approach to Ethical and Personalized Marketing

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Abstract

Business 5.0 is a new approach that focuses on combining advanced technologies with human values, aiming to create more ethical, sustainable, and personalized business practices. It builds on Industry 4.0 by using tools like artificial intelligence (AI), automation, and data analytics not just to improve efficiency but also to enhance human well-being and address real-world problems. One area where this shift is clearly visible is in marketing, especially through the rise of virtual influencers (VIs). VIs are the digital characters created to look and perform like real people. They are earning popularity on the platforms, namely Instagram, TikTok, and YouTube. These virtual personas are fully controlled by creators, which removes many of the ethical issues linked to human influencers, such as scandals or inconsistent behavior. In contrast to the real influencers, VIs are designed and interact in such a way that they build an emotional bond with their audience. These influencers propose several roles—they entertain, inform, and help users in the brand engagement. Because they can be programmed to learn and adjust to what consumers like, they offer highly personalized data and product suggestions. This makes them a valuable tool for the brands, allowing for more controlled, reliable, and risk-free communication. Their lifelike appearance, engaging features, and adaptability make VIs a strong example of how Business 5.0 technologies can be used to build innovative and more human-centered marketing strategies.

This study employs thematic analysis to examine findings from 30 literature review articles, focusing specifically on the results and conclusions to identify the patterns related to the research questions. The findings of this study conclude that VIs are a central tool to the realization of Business 5.0, especially as it pertains to facilitating ethical, human-centered, and emotional consumer engagement. In this study, the concept of Business 5.0, along with human-machine collaboration and VIs, are investigated by running an analysis on 30 papers from literature reviews published after the year 2020. VIs are operated by AI, which are positioned to provide human-centered and emotionally engaging content. The personalized interactions make them an attractive tool. While Business 5.0 is still an emerging field with limited academic literature, the VIs' integration shows how organizations are starting to embrace core values.

Categories: Consumer Behavior, Digital Marketing, Ethics in Marketing

Keywords: virtual influencer, business 5.0, consumer behavior, computer generated influencer, human-machine collaboration.

Introduction And Background

In today's fast-developing digital landscape, growing technologies such as artificial intelligence (AI), machine learning (ML), computer-generated imagery (CGI), and motion capture are transforming the way businesses engage with consumers. These enhancements have given rise to virtual influencers (VIs)—digitally created personas that interact with the audiences on social media platforms by mimicking human appearance and behavior. Unlike traditional influencers, VIs are created through high-tech algorithms and design tools, allowing for controlled, reliable, and customizable interactions with followers.

The development of VIs integrates thoroughly with the principles of Business 5.0, which represents a shift beyond the industrial automated goals of Industry 4.0 (Aithal, 2024). Business 5.0 highlights the integration of advanced technology with human-centric values, such as ethical behavior, sustainability, emotional awareness, and personalization. Instead of prioritizing efficiency and profit alone, this model targets on solving real-world problems and improving the wellness of individuals and society. It encourages a collaborative relationship between humans and intelligent systems, where technology is not just a tool but also an innovation partner.

Business 5.0 expands the concepts introduced in Industry 5.0, such as smart factories, human-machine collaboration, and cyber-physical systems, and applies them in a larger business context (Aithal, 2024) and (Dadwal et al., 2023). In this modern era, customer-focused, ethical marketing, and transparency have become core business objectives. Technologies like AI, Internet of Things (IoT), blockchain, and big data analytics are not limited to enhancing operational efficiency, but also to providing tailored experiences and building trust through ethical practices. The advancement of e-business into E-Business 5.0 reflects these goals, as companies move toward more adaptive, intelligent, and emotionally aware systems (Tariq,

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2024). Marketing 5.0 utilizes AI, IoT, and data analytics to balance competitiveness with ethical standards, personalization, and emotional engagement.

In the marketing field, VIs represent these values by offering brands a new way to connect with consumers. AI is utilized to analyze audience preferences and create content that resonates with specific demographics. CGI and motion capture technologies contribute to their lifelike appearances and movements, making interactions more interesting and relatable (Yu et al., 2024). The virtual characters can be programmed to demonstrate specific traits, emotions, and behaviors, empowering brands to maintain a reliable image and communicate across various platforms. Further, VIs can perform without the limitations associated with human influencers, such as personal scandals or inconsistent behavior, thus reducing the uncertainty for brands.

However, the integration of VIs into marketing strategies also represents various difficulties that require careful consideration. Ethical concerns about authenticity, transparency, and the potential for misconceptions are crucial. Consumers may question the authenticity of interactions with VIs, especially when their artificial nature is not disclosed. This ambiguity can generate trust issues and uncertainty about the motives behind the content. Additionally, the lack of real-world experiences and emotions in VIs may limit the development of strong, meaningful connections with audiences, which are often crucial for building brand loyalty.

In spite of these challenges, the potential of VIs in creating personalized and ethical marketing strategies is significant. They become valuable assets in the Business 5.0 landscape by engaging with the audiences in innovative ways, because of their ability to deliver tailored content and maintain consistent brand messaging. As technology continues to advance, the role of VIs is likely to expand, offering new possibilities and considerations for businesses targeting to connect with consumers in meaningful and responsible ways.

This paper aims to study the development of VIs from the perspective of Business 5.0, examining how they can be utilized to create ethical and personalized marketing strategies. With the help of current trends, digital innovation, and ethical considerations, the study aims to provide insights into the potential of VIs to transform the marketing landscape in a way that aligns with the human-centric objectives of Business 5.0.

Thus, this study is guided by the following research questions:

RQ1: In what ways are organizations integrating human-machine collaboration and ethical technologies in the transition to Business 5.0?

RQ2: In what ways do VIs impact emotional engagement, personalization, and consumer trust in the context of Business 5.0?

Although prior studies have discussed either Business 5.0 and VI individually or examine each area separately, this paper is among the first to explore their integration, providing a theoretical relationship between technological ethics, personalization, and emotion-driven marketing and by offering new insights into how businesses can leverage VI within a Business 5.0 framework.

Review

Introduction to Business 5.0

The Business 5.0 concept represents the next phase of digital evolution in the business environment, based on the technological advancements of Industry 4.0. While Industry 4.0 is defined by automation, data exchange, and smart technologies such as AI and IoT, Business 5.0 expands these advancements by focusing the human-machine collaboration, ethical considerations, sustainability, and personalization. As businesses adapt to the changing technological landscape, integrating AI, robotics, and advanced analytics, Business 5.0 develops a framework for achieving organizational excellence while prioritizing human-centered approaches and responsible practices (Aithal, 2024) and (Dadwal et al., 2023).

Human-machine collaboration and technological drivers

One of the primary aspects of Business 5.0 is the emphasis on human-machine collaboration. The shift, summarized by Aithal (Aithal, 2024) and Bharati (Bharati, 2021), that moves beyond traditional automation (Industry 4.0) where human intelligence and creativity are integrated with machine efficiency. This collaboration is considered essential for encouraging innovation, sustainability, and adaptability in organizations. The human-machine synergy is particularly notable in areas like personalized production, where consumer demands for tailored products and services are met through the flawless integration of technology and human input (Aithal, 2024) and (Dadwal et al., 2023). The human-centric approach examined by Bharati (Bharati, 2021) observes that the integration of advanced technologies like AI, IoT, and robotics with human decision-making capabilities supports more productive and personalized operations. VIs generally attract the attention and engagement, while a study found consumers tend to

trust human influencers more, making them more effective endorsers (Li et al., 2023). Human influencers are viewed as more mentally engaged (Liu and Lee, 2024). As examined by Looi and Kahlor (Looi and Kahlor, 2024), human influencers typically generate higher engagement by emphasizing self-branding, while virtual influencers focus on identity expression. This improves the overall performance of the business while ensuring that, in this innovation process, human creativity remains the central point. The application of these technologies in business models also leads to improved flexibility, especially during the time of the COVID-19 pandemic (Bharati, 2021). The technological drivers of Business 5.0 are diverse and include AI, ML, blockchain, and the IoT. These technologies help in more efficient decision-making, automation, and the creation of personalized experiences for consumers (Tariq, 2024). As discussed by Dadwal (Dadwal et al., 2023), these technologies facilitate the development of smart factories, and in this real time the adaptable business systems help in responding to the changing demands of consumers. The integration of AI and advanced analytics enables businesses to optimize operations and forecast trends, leading to better strategic decisions. Additionally, technologies like blockchain provide increased transparency and security, which are crucial for developing trust between businesses and their consumers (Tariq, 2024).

Ethical practices, sustainability, and data security

Ethics are core pillars of Business 5.0. As businesses seek to integrate smart technologies, the need for responsible practices becomes a primary concern. The ethical implications of data use, privacy, and algorithmic decision-making are critical considerations (Liyanaarachchi et al., 2024). As argued by Bakator and Vukoja (Bakator and Vukoja, 2023) to stay competitive in the digital age, businesses must prioritize ethical practices, including data privacy and environmental responsibility. This focuses on ethical business conduct not only to ensure consumer trust but also to promote long-term sustainability. Business 5.0, highlighted by Aithal (Aithal, 2024), encourages organizations to go beyond profit-maximizing motives by integrating social and environmental goals into their business strategies. This framework shift correlates with the increasing demand for corporate social responsibility, where sustainability and ethical governance are seen as key drivers of consumer loyalty and competitive advantage (Bakator and Vukoja, 2023). It becomes a critical concern as businesses in the Business 5.0 era increasingly rely on advanced technologies like AI and big data, raising concerns about data privacy and security. The risks interrelated with the VIs are highlighted by Liyanaarachchi et al. (Liyanaarachchi et al., 2024), particularly the weaknesses related to their artificial identities. VIs are generally viewed as less authentic, but human influencers still outperform VIs mainly due to their stronger perceived authenticity and relatability (Liu and Lee, 2024). The concept of “unbalanced privacy risk” demonstrates how VIs can expose consumers to the misuse of data, identity fraud, and cybercrime. While using VIs, organizations must implement strong data security measures and adopt privacy-conscious strategies to address these risks (Liyanaarachchi et al., 2024). This includes ensuring transparent data practices and integrating the best practices in cybersecurity to safeguard consumer information in an era where cyberattacks are increasingly common.

Personalization, emotional engagement, and virtual influencers

Industry 5.0 builds on the concepts of Industry 4.0 but shifts the focus toward personalization, human involvement, and sustainability in production systems. Industry 5.0 is described by Aithal (Aithal, 2024) and Dadwal et al. (Dadwal et al., 2023) as combining human creativity with the accuracy of machines to develop innovation and environmental responsibility. Industry 4.0 primarily focused on automation, while Industry 5.0 gives importance to the insight and decision-making of humans in optimizing business operations. According to Bharati (Bharati, 2021), human intelligence with advanced technologies allows organizations to address the growing demand of consumers for personalized, sustainable products. This human-machine collaboration is visible in many sectors, such as manufacturing, where factories powered by IoT, AI, and robotics enable highly intelligent personalized production processes that become helpful in serving the individual consumer needs. VIs are considered an innovative force in digital marketing, especially in the context of Business 5.0. VIs boost the brand visibility and image; their effectiveness in impacting the buying process has been limited due to the lower perceived authenticity and weaker parasocial connections (Lou et al., 2022). Brands try to find out more personalized and cost-efficient ways to engage with consumers, and VIs offer several advantages over the traditional human influencers. Research by Volles et al. (Volles et al., 2024) shows that when consumers feel a connection with VIs, their perceived uniqueness can positively influence the brand perception and ad effectiveness. The effectiveness of VIs was examined by De Cicco (De Cicco et al., 2024) and Sands et al. (Sands et al., 2022) in consumer engagement and brand marketing. It was found that when the designs of the VIs align with the consumer expectations, they can replicate the impact of human influencers. The appeal of VIs lies in their ability to offer consistent performance, high engagement, and cost efficiency (Allal-Chérif, 2024). The VIs were seen as more trustworthy and credible, which aligned well with the preferences of consumers and increased their purchase intent (Gerlich, 2023). VIs seem more credible when they use logical and rational language instead of emotional appeals (Ozdemir et al., 2023). Individuals who trust machines are more likely to see VIs as more authentic (Lee et al., 2024). VIs are designed to be highly adaptable and capable of being programmed with specific traits that align with a brand's identity and values. The brands can control the personality and story of the VIs, which becomes helpful in maintaining a strong digital presence without the ethical dilemmas which are associated with the human influencers (Allal-Chérif,

2024) and (Koles et al., 2024). However, as noted by Koles et al. (Koles et al., 2024) and Kim et al. (Kim et al., 2024), the authenticity of the VIs remains a significant challenge. While highly anthropomorphized (humanized) VIs are able to get a strong emotional response from audiences, those that appear artificial may struggle to connect with the consumers on a deeper level. This highlights the importance of balancing technological innovation with emotional connection, which becomes valuable in enhancing the effectiveness of VIs in marketing campaigns (Kim et al., 2024). The emotional connection between consumers and VIs is a critical factor influencing the success of marketing campaigns in Business 5.0. A study by de Brito Silva et al. (de Brito Silva et al., 2022) highlighted avatars' dual functionality that they can operate effectively through both humanization tactics and metaverse integration. As discussed by Yu et al. (Yu et al., 2024) and Yan et al. (Yan et al., 2024), the emotional design of VIs—such as their facial expressions, tone of voice, and overall presentation—plays a significant role in shaping the engagement of the users. For developing parasocial relationships, emotional cues are very important, which are the key in creating long-term consumer loyalty (Yu et al., 2024). Human-like VIs fostered stronger parasocial relationships, which result in higher purchase intention (Ma and Li, 2024). As Mrad et al. (Mrad et al., 2024) examined, VIs extract complex emotional reactions, including appreciation, envy, and gratitude. The emotional responses are shaped by recognizing the authenticity of the VIs, like how real or human-like they seem. The study highlights the importance of emotional engagement in digital marketing, particularly when utilizing VIs to build consumer-brand relationships.

Marketing 5.0 and the role of virtual influencers

Marketing 5.0 represents a transformation in the field of marketing, driven by rapid technological evolution and changing consumer expectations. The integration of innovative technologies like AI, big data, IoT, and other technologies facilitates more precise, personalized, and ethical marketing approaches. It advances the traditional marketing focus by giving importance to the human-centric and value-driven practices in the technological infrastructure of the marketing operations. The application of AI is the key theme for enhancing marketing effectiveness within Marketing 5.0. Social Influence Theory helps in examining the virtual influencers' effect on consumer behavior, which provides actionable insights for marketers seeking to leverage them to foster deeper consumer connections (Davlembayeva et al., 2024). AI assists brands to anticipate the customer needs, create hyper-personalized campaigns, and optimize content delivery in real time. As emphasized by Haleem et al. (Haleem et al., 2022), the transformative potential of AI in marketing highlights its ability to manage large datasets, personalize user experiences, and help in improving targeting strategies. Because of AI, marketers are able to act and speak to customers based on immediate information, improving their satisfaction and the possibility of making a purchase. Besides, AI helps with competitive benchmarking by studying the campaigns of competitors and revealing what their customers are expecting. ML, which is part of AI, refers to systems capable of learning and getting better on their own, without detailed programming. Similarly, a research team led by Verma et al. (Verma et al., 2021) did a wide-ranging systematic literature review of 1,580 publications to explore the increasing role of AI and similar technologies in marketing. By assessing research papers, ideas, and peer relationships, they found out which areas were focused on the most, which scholars were most influential, and where there were gaps in the literature. The research team applied co-citation, co-occurrence, and the Louvain clustering method to the studies and discovered the biggest areas and future directions in IT, including predicting future events, customized AI, and automating tasks. The review highlights that AI can greatly improve marketing and promote further investigation into the latest technological developments. Accordingly, Bakator and Vukoja (Bakator and Vukoja, 2023) observed how the business world is changing due to more digitalization and pressure to act responsibly, and they noted how Marketing 5.0 has emerged to respond accordingly. It was determined that competitiveness relies on external factors, a company's capabilities, how it decides its strategy, and how it follows ethical standards. The study highlighted that AI, IoT, and big data analytics are used to create a stronger bond with consumers. They looked into future trends, including virtual and augmented reality, voice assistants, predictive automation, and AI-boosted personalization. Importantly, the study introduced a theoretical model using qualitative information, giving practical advice for businesses to succeed in the Marketing 5.0 environment. VIs, as a part of these innovations, represent the main principles of Marketing 5.0. A study by Deng et al. (Deng et al., 2024) found that VIs led to better ad recognition. They use technology to engage consumers with realistic experiences, following ethical rules in marketing. Data analysis in search of insights helps VIs strengthen emotional connections, makes brands more trusted, and helps them keep a consistent and non-controversial image. Therefore, they combine human-centered digital innovation with an effective marketing strategy that matches the objectives of Business 5.0. In this context, VIs are digital marketing tools and also indicate a fundamental change toward intelligent, ethical, and emotionally engaging consumer-brand interactions that are key to the concept of Marketing 5.0.

Conclusion of Business 5.0 is a paradigm shift in the form of doing business, as it entails the combination of human creativity with machine efficiency, ethical and responsible behavior, and customized engagement. The literature review from Industry 5.0, marketing, and VIs' perspectives identifies collaboration between humans and machines, sustainability, and emotional engagement as critical for the future of business. The companies that can find the balance between technology, ethics, and application will ultimately ensure long-term success.

Although the developments of Industry 4.0 as well as the employment of advanced technologies in business processes have been widely discussed, a gap remains in the literature regarding the adoption of advanced technologies alongside human-centric values as imagined in the concept of Business 5.0. In addition, while influencer marketing has been researched generally, VIs specifically have not received much scholarly attention, especially related to emotional engagement, personalization, and ethical branding. The bulk of the existing body of research has either been concerned with the technological capabilities of AI or the human, personal, and often ethical qualities of human influencers, neglecting how VIs function as a bridge between technological innovation and human-centered marketing. This indicates a significant lack of information regarding the process of human-machine collaboration and ethically oriented technologies and how this might affect consumer trust and emotion in the marketing domain. Thus, this study seeks to understand how VI can participate in a transition toward Business 5.0 marketing practices.

Figure 1 presents the yearly publication trend on Business 5.0 and VIs, highlighting the growing academic interest in these areas.

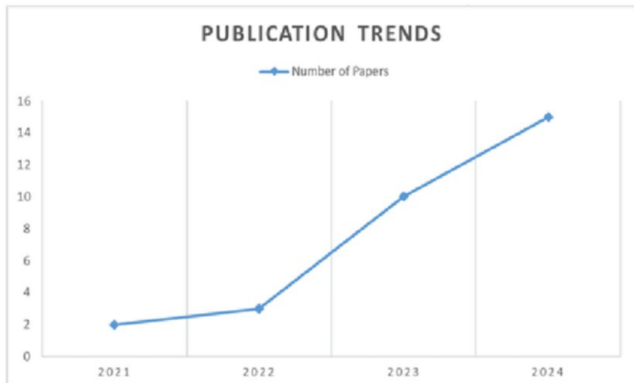


FIGURE 1: Publication trends in Business 5.0 and Virtual Influencer research

The figure shows the number of publications per year (2020–2024) based on the reviewed literature.

Source: Author's own compilation

As the data show, research on VIs has grown rapidly since 2020, while Business 5.0 is still an emerging area that is slowly gaining attention.

This study employs qualitative content analysis to examine findings from 30 literature review articles, focusing specifically on the results and conclusions to identify patterns related to the research questions. After familiarizing with the content, the researcher coded recurring ideas such as human-machine collaboration, ethical AI use, emotional marketing, and the psychological impact of VIs. These codes were then organized with the study’s objectives-particularly the integration of ethical technologies in Business 5.0 and the influence of VIs on emotional engagement, personalization, and trust. Qualitative content analysis enabled the organization of diverse insights into structured categories, offering a comprehensive integration of how Business 5.0 principles and VIs are conceptualized in current academic discourse. This method allowed the study to draw detailed interpretations from existing research without relying on new data collection, making it especially suitable for a qualitative investigation based entirely on the secondary sources.

Table 1 summarizes the reviewed literature on Business 5.0 and Virtual influencer, highlighting the key points, focus area, methodologies and the contributions of the selected studies.

Citations	Focus	Key Points	Methodology	Findings / Contribution
(Bakator and	Marketing 5.0 and Business	Digital marketing, AI, IoT, big data analytics,	Qualitative analysis	Theoretical model on digitalization

(Vukoja, 2023)	Competitiveness	future trends (AR/VR, voice assistants)		transforming marketing
(Aithal, 2024)	Industry 5.0	Human-machine collaboration, sustainability, innovation, human-centric systems	Literature review	Principles and strategies for Industry 5.0 implementation
(Bharati, 2021)	Industry 5.0	Human creativity and machine efficiency integration, personalization, resilience	Review/Conceptual	Emphasizes ethical, resilient, human-centric innovation
(Tariq, 2024)	E-Business 5.0	AI, IoT, blockchain integration for efficiency, personalization, security	Review	E-Business 5.0 as a transformative digital commerce phase
(Dadwal et al., 2023)	Industry 5.0	Human-centered AI, smart factories, cyber-physical systems	Conceptual review	Augments human capabilities in smart manufacturing
(De Cicco et al., 2024)	Virtual Influencers (VIs)	Comparison of human vs virtual influencers' impact on trust and authenticity	Experimental study	VIs are comparable to humans when highly anthropomorphized
(Davlembayeva et al., 2024)	Social Influence Theory and VIs	Warmth, competence, and credibility drive consumer engagement	Survey	Influencer traits shape purchase intentions
(Gerlich, 2023)	VI vs Human Influencers on Social Media	VIs are seen as trustworthy and credible; they improve purchase intentions	Survey	Supports marketing strategies using VIs
(Kim et al., 2024)	Trustworthiness and Novelty in VIs	HVI has better engagement without sponsorship disclosure; AVIs gain novelty engagement	Experimental study	Sponsorship disclosure affects trust and engagement
(Kim et al., 2024)	VI Interface Design	Emotional reactions (coolness vs eeriness) affect engagement	Experimental study	Coolness increases engagement; eeriness reduces purchase intent
(Lee et al., 2024)	Authenticity and Machine Heuristic	Trust in technology increases perceived VI authenticity and purchase intention	Online experiment	Psychological predispositions are critical in influencer marketing
(Li et al., 2023)	Influencer Type and Sensory Cues	Human influencers are more trusted than VIs; sensory cues moderate endorsement	Experimental study	Trust remains stronger for human influencers
(Liyanaarachchi et al., 2024)	Data Privacy in VIs	Privacy risks from artificial identities: multi-privacy paradox model	Theoretical model	Recommendations for ethical data use and privacy frameworks
(Looi and Kahlor, 2024)	Persuasive Impact of Influencers	Human influencers have higher engagement; VIs focus on identity expression	Sentiment and topic modeling	Influencer tier and verification affect interactions
(Ma and Li, 2024)	Human-like Appearance of VIs	More human-like VIs increase parasocial interaction and brand attitude	Online experiment	Well-designed VIs are comparable to humans in branding
(Ozdemir et al., 2023)	Shift from Celebrities to VIs	Humans find that more credible, rational language reduces the VI credibility gap	Experimental studies	Communication strategies can improve VI effectiveness
(Volles et al., 2024)	Uniqueness of VIs in Advertising	Perceived uniqueness of VIs positively affects advertising effectiveness	Experimental studies	Unique VIs can mitigate trust deficits
(Yan et al., 2024)	Emotional Bonds with VIs	Animated and non-human VIs foster stronger emotional bonds than mimic-human VIs	Experimental study	Social presence mediates emotional attachment
(Yu et al., 2024)	Emotional Expression in CGI Influencers	Emotional cues in virtual influencers increase user engagement	Experimental study	Emotional design is crucial for digital marketing engagement
(Allal-Chérif, 2024)	VIs in Fashion Marketing	VIs' consistent performance, cost efficiency, and high engagement	Analytical review	VIs as strategic tools for global fashion brands
(de Brito Silva et al., 2022)	Avatar-based Marketing	Avatars create authenticity via storytelling and metaverse integration	Mixed methods	Typology of avatars and marketing risks/benefits
(Koles et al., 2024)	Authenticity in VIs	ERC framework: true-to-ideal, true-to-fact, true-to-self	Theoretical framework	Authenticity is linked to audience expectations
(Liu and Lee, 2024)	Endorsement Effectiveness	Product type and authenticity affect VI vs human influencer effectiveness	Experimental study	Humans outperform VIs generally; product alignment helps VIs
(Liu and Lee, 2024)	Responsibility Attribution	Humans assigned more responsibility than VIs; mindfulness influences attribution	Online experiments	Responsibility attribution impacts brand attitudes and sharing
(Lou et al., 2022)	Why Digital Natives Follow VIs	Motivations: novelty, entertainment, aesthetics, info, social interaction	Theoretical analysis	Users accept "authentically fake" personas, but with limited purchase impact

(Mrad et al., 2024)	Consumer-VI Relationships	Social comparison, parasocial interaction, and anthropomorphism create paradoxical bonds	Qualitative & theoretical	Emotional complexity in human-like VIs
(Sands et al., 2022)	Virtual Influencers Challenges	Authenticity issues, ethical concerns, exaggerated beauty ideals	Conceptual analysis	Challenges and potential of VIs in future branding
(Deng et al., 2024)	Ad Recognition with VIs	VIs improve ad recognition, but hyper-realism lowers ad impact	Experimental studies	Sensory realism moderates advertising effectiveness
(Verma et al., 2021)	AI in Marketing	AI as a driver in marketing transformation: bibliometric review	SLR and network analysis	Research gaps and key themes in AI-driven marketing
(Haleem et al., 2022)	AI Applications in Marketing	AI enables personalization, data management, and competitive analysis	Literature review	ML improves over time; increases customer comfort & purchases

TABLE 1: Summary of reviewed literature

AI, artificial intelligence; IoT, Internet of Things; SLR, Systematic literature review.

Source: Author's own compilation

Methodology

This study adopts a qualitative research approach based on secondary data analysis. The objective is primarily to understand the relationship between Business 5.0 and VIs, focusing on the dimensions of technology, ethics, and their impact on consumer engagement. Rather than gathering new data, this study revises and analyses findings from other researchers.

Inclusion Criteria

All the articles used in this study were collected from databases like Scopus and Google Scholar, which include high-quality academic research. The search was performed using keywords like “Business 5.0,” “Industry 5.0,” “virtual influencers,” and “human-machine collaboration.” The articles were selected based on their relevance to the study’s focus, specifically, those discussing human-machine interaction, ethical technology use, advanced digital tools, and new marketing approaches involving VIs.

Articles published after 2020 were included, as both Business 5.0 and VIs are new and emerging topics. In addition, only English articles were included so that all materials could be clearly understood and analyzed consistently. In the final synthesis, 30 were included out of the 80 initially analyzed articles based on these criteria.

The study used thematic analysis, which means looking for common ideas or patterns across the selected articles. The results and conclusion sections of each paper were carefully read, and the most important points were highlighted. These findings were then grouped into main themes that matched the research questions, such as human-machine collaboration, ethical and responsible marketing, emotional engagement, personalization, and consumer trust.

This method helps summarize and organize what has already been discovered in the field. It provides useful insights without collecting new data, and the findings are based completely on existing research.

Results

In this study, the concept of Business 5.0, along with human-machine collaboration and VIs, is investigated by analyzing 30 literature review papers published after 2020. VIs are operated by AI, and are positioned to provide human-centered and emotionally engaging content. The personalized interactions make them an attractive tool. While Business 5.0 is still an emerging field with limited academic literature, the VIs’ integration shows how organizations are starting to embrace core values.

The research employed a qualitative methodology relying on secondary data and revolved around two main problem statements: (1) how organizations are integrating human-machine collaboration and ethical technologies in the transition to Business 5.0? And (2) how VIs are impacting emotional engagement, personalization, and consumer trust in this context? The results suggest several important conclusions.

RQ1: Human-Machine Collaboration and Ethical Technologies in Business 5.0

As organizations shift toward Business 5.0, they prioritize not only automation and productivity (e.g., Industry 4.0) but also human-centered, sustainable, personalized, and ethical business design. It is a move to incorporate AI-based technologies such as VIs into organizations. In this transition, VIs are seen as instruments of human-machine collaboration, combining the efficiency and consistency of machines with creative, human-centered design.

Brands are utilizing VIs as marketing communicative agents to automate, yet promote a personal element. For example, AI avatars such as Lil Miquela or Imma imitate the human-like interaction via realistic visuals and scripted social media posts, yet are entirely under the control of companies. It guarantees a uniform messaging, strategic, as well as free of bias.

Businesses are also making use of ethical technologies by integrating the principles of transparency, accountability, and inclusivity into the use of VI. Many studies emphasize that clear disclosure of a VI's artificial nature contributes to consumer trust and avoids the ethical response.

In terms of technological design, companies are focusing on creating such VIs that are emotionally capable of mimicking empathy, emotional cues, and relatable storytelling. These characteristics become the center of Business 5.0, which reflects the ethical and emotional priorities.

This transformation reflects a broader trend: human-machine collaboration is not about replacing humans, but rather using intelligent agents to enhance the creativity of humans, reduce bias, and scale personalization in ethical ways.

RQ2: Emotional Engagement, Personalization, and Consumer Trust with Virtual Influencers

VIs are the key pillars of Business 5.0, which emerged as the powerful agents of emotional connection and digital personalization. Their impact is supported by the psychological theories, such as mind perception theory, endorsement theory, and social presence theory, which help in explaining why consumers respond positively to non-human agents.

Emotional Engagement: The reviewed literature finds that consumers often form parasocial relationships with the VI. These one-sided emotional bonds are similar to those formed with celebrities or human influencers. Interestingly, non-human or animated VIs often generate stronger emotional connections because they are perceived as less threatening, more novel, and more approachable. Mimic-human VIs (those designed to look extremely lifelike) sometimes face the uncanny valley effect, which can reduce emotional comfort and engagement.

Personalization: VIs are also highly personal and customizable, as brands can program them according to target audiences' demographic and psychographic characteristics and social values. AI allows for real-time interaction and adaptation, and ultimately results in a sense that marketing is personalized and relevant to the individual consumer. For example, VIs can be designed to reflect regional languages, fashion styles, or values, making them more culturally relevant and engaging.

Consumer Trust: Trust in the VIs is increasing, especially when the VIs are constructed and represented as transparent artificial entities. VIs provide controlled, predictable behavior, unlike that of human influencers, which can be subject to scandal or other inconsistencies. Some studies find that, particularly regarding the fashion, beauty, or tech industries, among others, consumers perceive VIs as more objective, less biased, and more consistent in their messaging. On the other hand, trust is dependent on transparency and perceived authenticity. Trust can be reduced if a VI pretends to be human or misleads consumers. Also, the contexts in which VIs are more effective than human influencers are not consistent across the board. VI outperforms human influencers in controlled branding, cost effectiveness, and dynamic content, though humans are still superior in deep authenticity and complex emotional storytelling.

Conclusions

The findings of this study conclude that VIs are a central tool to the realization of Business 5.0, especially as it pertains to facilitating ethical, human-centered, and emotional consumer engagement. They are intermediaries between automation and personalization, providing companies with scalable means of establishing trust and loyalty in a digital context. Companies that embrace VIs responsibly through transparency, ethical AI usage, and cultural sensitivity will have a competitive advantage in the market of the future.

Future research direction: In future research studies, it should be examined in which way people are affected by the VIs over a while, especially as these VIs become smarter and more emotionally responsive. It is also important to study different types of VIs, such as mimic-human, non-human, and animated, and how they influence people of different ages, cultures, and interests. Researchers should also test the VIs'

performance in real marketing situations by measuring results, like in which case people want to buy a product, stay loyal to a brand, or remember messages. The review contributes by linking two formerly under-connected domains and highlights the need for further empirical research, how VIs perform in the real-world Business 5.0 environment. Researchers should also study ethical topics such as the way VIs use personal information, their potential to persuade how people feel, and if any biases are present in their technology. The advancements of AI could make it hard for people to recognize the difference between the content made by a person and by a machine. Researchers should therefore look into the effects of honesty and transparency on trust. Ultimately, taking lessons from marketing, psychology, ethics, and technology can help us grasp the way VIs possibly assist in bringing about ethical and human-driven new innovations in digital spaces.

Implications: This study highlights how VIs can act as strategic tools in achieving the goals of Business 5.0 by broadly enhancing the personalization, emotional engagement, and trust of consumers. For practitioners, the findings suggest that brands should adopt the VIs not as replacements for human influencers but as supporting assets that allow controlled, adaptable, and ethically guided marketing. The identity of VI should ensure transparency and utilization of AI for emotional intelligence, and regional relevance can significantly increase consumer trust and engagement. The organizations that use VI in an ethical and responsible way, like being fair, accountable, and having clarity, are more likely to foster long-term loyalty and competitive differentiation in increasingly digital markets.

The study expands the currently available theories on human-machine collaboration by presenting how the VIs can prioritize the human-centric and ethical requirements in the Business 5.0. The mind perception theory and social presence theory support and refine it by demonstrating that emotional relationships can be established with artificial agents, namely, when they are perceived as new and transparent. The findings also suggest a thorough understanding of the uncanny valley, indicating that emotional comfort is higher with the VIs that are stylized or artificial rather than the lifelike ones. This helps in developing new ideas about how people trust digital identities and AI in marketing.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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