



The Secrets of Attractiveness of Digital Twin: A Study of Digital Twin Images Based on Consumers' Preferences

Jiajia Lin*

New Channel, Xiamen, 361001, China

*Corresponding author. Email: 431772115@qq.com

Abstract. With the development of metaverse technology and artificial intelligence, digital twin endorsement, as a new type of marketing carrier, is intrinsically related to consumers' preferences. This study constructs a theoretical framework of digital twin characteristics and consumers' preferences based on a questionnaire. The results show that the appearance and type of digital twin positively affect consumers' preference. Consumers have the right to customize the digital twin independently. The negative perception caused by lack of reality can be weakened by enhancing the sense of customization and emotional attachment. This study provides theoretical support for brands to optimize their digital twin strategies, reveals the psychological mechanism underlying consumers' decisions in virtual endorsement scenarios, and supplements the marketing theory gap regarding non-human endorsement subjects.

Keywords: Digital Twin; Virtual Endorsement; Consumers' Preferences; Brand Marketing; Questionnaire

1 Introduction

With the rapid development of artificial intelligence, virtual reality and other digital technologies, digital twin endorsement is gradually changing the traditional endorsement pattern as a new type of brand marketing. Digital twin is a virtual digital human created by artificial intelligence and digital technology, which simulates a person's characteristics and behavior through video, sound and motion capture technologies, and is able to appear in various marketing scenarios, such as ads, live streaming and social media, with a highly realistic image. In terms of market development, the digital human has attracted extensive attention and participation across industries, and the market for digital ambassadors is growing. Many well-known brands have launched their own digital twin ambassadors, such as Jackson Yee's virtual image Qian Miao, and Dilraba's IP called Dililengba. These virtual image ambassadors have a large number of fans on social media and show a strong commercial influence. Meanwhile, virtual digital humans can also cross physical boundaries to provide an uninterrupted interactive experience and accurately cater to young groups. It plays a significant role in meeting their pursuit of novelty, individual expression, and cultural identity, as well as building deep connections between brands and young consumers.

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It is of great significance to deeply study the perfect image and consumers' preferences for digital twin endorsement. For brands, it can help them accurately shape the image of digital twin ambassadors, formulate effective marketing strategies, and improve the communication effect and market competitiveness of brands. From the academic perspective, it enriches the marketing content of virtual ambassadors in the fields of advertising and marketing, and provides theoretical support and practical references for subsequent related studies. In addition, it promotes the development of the entire digital economy industry, facilitates the in-depth integration of digital technology and brand marketing, and gives rise to more innovative business models and marketing tools.

The purpose of this study is to explore the perfect image characteristics of digital twin endorsement and consumers' preferences. Specifically, it includes the following aspects: first, clarify the consumers' expectations of the digital twin image in terms of appearance, personality and ability. Second, analyze the factors affecting consumers' preference for digital twin endorsement. Third, explore the differences in the effectiveness of digital twin endorsement in different product types and marketing scenarios.

The innovation of this study mainly includes the following aspects: First, the innovation of research perspective. The study combines the perfect image construction of digital twin endorsement with consumers' preferences, which makes up for the shortcomings of previous studies in this field and provides a more comprehensive perspective for brands to create attractive digital twin ambassadors. Second, the innovation of research content. The study explores in depth the various factors affecting consumers' preference for digital endorsement, including cultural background, consumption values and other deep-rooted factors, and discusses the application effect of digital twin endorsement in emerging marketing scenarios (e.g., metaverse marketing), which provides new ideas and directions for the development of digital twin endorsement.

At present, studies on digital twin endorsement and consumers' preferences are gradually increasing, but are still in the development stage. Some studies have focused on the advantages and application scenarios of digital twin endorsement, such as digital twin ambassadors have the advantages of a flexible image, no time and space constraints, and no risk of negative news, which can bring a new marketing experience for brands. In terms of consumers' preferences, the study found that consumers' acceptance of digital twin ambassadors is affected by a variety of factors, including the realism of the digital twin's image, the ability to interact, and the degree of fit with the brand. However, there are still some shortcomings in the existing studies. On the one hand, there has not yet been a unified understanding of the characteristics of the perfect image of digital twin ambassadors, and there are some differences in the conclusions between different studies. On the other hand, most of the studies on the factors affecting consumers' preferences focus on the surface, and there are few studies on deep-rooted factors such as cultural background, consumption values, etc. In addition, there is no in-depth study on the differences in the effects of digital twin endorsement in different product types and marketing scenarios. Based on the existing studies, this study will further explore the perfect image of digital twin endorsement and consumers' preference to make up for the shortcomings of the existing studies.

2 Literature Review

2.1 Concept And Development of Digital Twin Endorsement

Digital twin endorsement refers to the marketing method in which brands use digital technology to create virtual digital human similar to the image and behavior of real human instead of real ambassadors for brand promotion and product publicity. Digital twin can realize interactive communication with consumers through a variety of technical means, such as facial recognition, motion capture, voice synthesis, etc., which highly restore the appearance, expression, voice and behavior of human. The development of digital twin endorsement can be traced back to the early virtual idols, such as Japan's virtual singer Hatsune Miku, who has attracted a large number of fans around the world with her unique image and music style, thus opening up a precedent for the application of virtual characters in the field of entertainment. With the continuous progress of technology, the digital twin's image is more realistic and increasingly powerful, and has gradually expanded from the entertainment field to the marketing field. In recent years, with the maturity of artificial intelligence, virtual reality and other technologies, digital twin endorsement has ushered in a period of rapid development. More and more brands have begun to adopt digital twin ambassadors for marketing activities such as advertising and livestream selling. Cheng et al. explored how AI tools could empower digital twin in cross-media content from the construction mechanism of digital twin for livestreamers, and how to use AI technology to better realize digital intelligence transformation and build a more communicative digital image to adapt to the development needs of web 3.0[1]. Pu et al. observed the subjective consciousness of Generation Z in media selection and media combination utilization through digital twin, and found that digital twin has become the evidence of role-playing and self-viewing for Generation Z[2]. Li et al. constructed a digital twin endorsement model to explain the causes and effects of the product fit of digital twin, and decomposed the types of fit into reality fit and relevance fit, in response to the problem of fit between virtual images and real products triggered by the fact that digital twin endorsement usually involves the use of real products. The results show that both reality fit and relevance fit significantly affect consumers' attitudes toward digital twin endorsement[3].

2.2 Relevant Theories of Consumers' Preference

Consumers' preference refers to the subjective tendency that consumers show towards different brands and product characteristics when purchasing goods or services. In the field of marketing, consumers' preference theories mainly include utility maximization theory and need-hierarchy theory. Among them, the utility maximization theory indicates that consumers will maximize their own utility when making purchase decisions, i.e., choosing goods and services that can bring them the greatest satisfaction. The need-hierarchy theory, proposed by Maslow, divides human needs from low to high into five levels, including physiological needs, safety needs, social needs, respect needs and self-actualization needs. Consumers' purchasing behavior is often affected

by their hierarchy of needs. In terms of studies on consumers' preference for ambassadors, studies have shown that factors such as ambassadors' image, popularity, credibility, and professionalism affect consumers' purchasing intentions and attitudes. Meanwhile, consumers' personal characteristics, such as age, gender, cultural background, and consumption values, also have a moderating effect on their preferences. For example, young consumers may tend to choose an ambassador with a fashionable image, while middle-aged and old-aged consumers value the ambassador's professionalism and credibility more. Shah et al. used a cross-sectional research design and invited 426 Indian respondents to visit the ins page of a specific digital twin influencer identified through a pre-test. The results showed that digital twin' morphology, behavior, and emotions all have the positive effect on consumers' engagement with digital twin, and perceived reality of digital twin moderates consumers' engagement[4]. Hanus et al. found that a persuasive digital twin might be more capable of convincing consumers in virtual interactive environments[5]. Xie et al. verified the relationship between digital twin's characteristics and brand fan effect by obtaining data from 733 Chinese respondents. The results show that morphological reality and behavioral reality of digital twin for experiential products have a stronger effect on consumers' positive emotion than brand fit; brand fit of digital twin for search products has a stronger effect on consumers' positive emotion than morphological reality and behavioral reality[6]. Oliveira et al. conducted in-depth interviews with executives from 14 digital twin development companies around the world. The study found that digital twin could reshape a company's international dynamic marketing capabilities by integrating cutting-edge technologies [7]. Fan et al. pointed out the increasingly dramatic growth of virtual environments and digital twin. Digital human and digital twin are not only an independent and comprehensive research field, but also an important tool for conducting scientific research and practicing scientific communication[8]. Shen et al. proposed X-vatar as a novel twin model that could capture the full strength of a digital human to bring vivid experience in remote virtual scenarios. Our approach models the body, hands, facial expressions, and appearance in a holistic manner and can be learned from complete 3D scan data or RGB-D. In order to achieve this goal, we proposed a learning-based module through the practice perception, which enables expressive animation of X-vatar. In order to efficiently learn neural shapes and deformation fields, we proposed part-aware sampling, which allows the model to generate higher fidelity results while maintaining efficient training[9]. Chaffin et al. proposed to improve the existing digital twin model to ensure effective simulation of complex dynamic tasks[10].

2.3 Current Status of Studies on Digital Twin Endorsement and Consumers' Preference

In terms of academic research, many scholars have paid attention to the emerging field of digital twin endorsement. Some scholars have explored the appearance characteristics of digital twin through experimental methods, including the proportion of facial features, skin color, etc., and found that digital twin close to the golden ratio and with unique facial features perform better in attracting consumers' attention. In

particular, younger consumers are more receptive to digital twin with bright colors and exaggerated styles. Studies on personality characteristics show that positive, optimistic and creative digital twin are better at creating an emotional connection with consumers. Consumers think that brands endorsed by these types of twins are more energetic and innovative.

3 Questionnaire Survey

In this paper, a questionnaire was designed to address consumers' perception and preference of digital twin endorsement. The questionnaire was distributed through online and offline methods. Social media platforms and online research platforms were utilized for online promotion. And randomly distributed in offline places with high traffic such as shopping malls, schools and office buildings. The questionnaires covered consumers' basic information, knowledge of digital twin endorsement, preference for different twin endorsement images, image of digital twin and brand fit, and a total of forty one valid questionnaires were returned. The questionnaire survey was analyzed using statistics in order to understand the distribution of consumers' basic information and the overall cognition of the digital twin endorsement; relevant statistical methods were used to explore the relationship between the perfect image of the digital twin and the consumers, and to dig out the key factors affecting the consumers' preference.

3.1 Consumers' Preference for Different Types of Digital Twin

In terms of preference for appearance, it was found through the questionnaire that 60% of consumers preferred anime-style digital twin, and thought that their images were cute and imaginative; 25% preferred realistic digital twin, and thought that they were more realistic and reliable; 15% preferred sci-fi digital twin, and were attracted by the futuristic and technological style.

In terms of preference for type, the humorous and fun type is the most popular, accounting for 55%, and consumers believe that this type of digital twin can bring a pleasurable shopping experience; then followed by the gentle and friendly type, which is able to give consumers emotional comfort and care; the professional and reliable type is also favored by a number of consumers, as consumers can be given professional advice when purchasing goods.

In terms of industry suitability, there are slight differences in the digital twin suitable for different industries. In the fashion and entertainment industry, those with anime-style and strong fashion appeal are the most popular. In the technology industry, realistic and professional images are more favored by consumers.

3.2 Factors Affecting Consumers' Preferences

First, in terms of age, young consumers (around 20 years old) prefer anime-style and lively digital twin, accounting for 75% and 25% respectively. As age grows, consum-

ers' preference for realistic, professional and reliable digital twin gradually increases, and the percentage of those above 35 years old who prefer a realistic style is even higher.

Next, in terms of gender, female consumers prefer a gentle and friendly style compared to male consumers, while male consumers prefer a sci-fi, professional and reliable type compared to female consumers. Women pay more attention to the emotional experience and interpersonal communication in the consumption, and the gentle and friendly digital twin can give them emotional care and support to meet their emotional needs. Men are usually concerned about technological innovation, and a sci-fi digital twin can stimulate their curiosity and desire to explore. When purchasing products, male consumers make decisions based on rational analysis. Professional and reliable support can give them a valuable reference.

In terms of consumption habits, consumers who frequently purchase online are more receptive to the digital twin endorsement, and they pay more attention to the promotional information and recommended content of the digital twin. These consumers are accustomed to obtaining product information through the Internet in the process of online shopping. As a new form of online marketing, digital twin can attract their attention, and its recommended promotional activities and product information can directly affect consumers' purchasing decisions. Consumers who pay attention to brand quality focus on the brand values and professional image conveyed by the digital twin more. They are more inclined to buy well-known brands when choosing products. If digital twin can convey the brand's concept of high quality and value and demonstrate professional product knowledge, they will be more likely to be recognized by these consumers. In addition, impulsive consumers are more likely to be affected by the image of the digital twin and the way it is promoted; while rational consumers are more concerned about the product information and actual value generated by the digital twin.

In terms of other factors, consumers' personal values, emotional resonance, and technological acceptance also affect preference for digital twin. Consumers with values of environmental protection and public welfare are more inclined to buy brands that convey the same values, and consumers are able to emotionally resonate with these brands.

3.3 Marketing Environment

On social media platforms, digital twin can be accurately recommended to consumers using platform algorithms in the form of short videos and live streaming, which can trigger discussions and spread. On e-commerce platforms, digital human as virtual livestreamers are able to practice live streaming for 24 hours a day to display products and increase the conversion rate of consumption. The communication characteristics of different channels affect consumers' exposure to and awareness of digital twin endorsement. In a competitive market, brands use digital twin endorsement to create differentiated advantages. For example, the unique image design of digital humans and innovative digital marketing patterns are more likely to attract consumers' attention and choice. If the market is flooded with digital twin endorsements and the ho-

mogenization is serious, consumers may have aesthetic fatigue and lower their preference.

4 Conclusion

In this paper, a questionnaire was designed to address consumers' perceptions and preferences of digital twin endorsement. The questionnaire was distributed through online and offline methods. A total of forty-one valid questionnaires were returned. The questionnaire survey was analyzed using statistics to understand the distribution of consumers' basic information and the overall cognition of the digital twin endorsement; relevant statistical methods were used to explore the relationship between the perfect image of the digital twin and the consumers, and to dig out the key factors affecting the consumers' preference. Through the investigation of this study, the relationship between digital twin endorsement and consumers' preference is constructed, which provides a scientific basis for the brand in choosing digital twin endorsement and optimizing the image design of digital human to develop marketing strategies, helps the brand to improve marketing effectiveness and market competitiveness, and provides theoretical support and practical guidance for the further development of digital twin technology in the field of brand marketing.

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