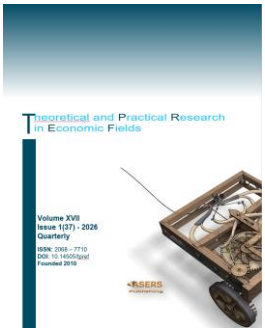
Use of Deepfake-Powered Virtual Anchors in Live Commerce Influences Women's Shopping Behaviour in the Southeast Asian E-Commerce Industry



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Abstract: This study explores the introduction of deepfake technology in live commerce, particularly the effects of using virtual anchors (AI live streamers) to increase engagement and improve sales conversion rates. Realistic high-quality virtual anchors were enabled using DeepFaceLab that generates real-time facial animation, while Vizard Virtual Reality Software is developed for an interactive and engaging live streaming environment. Three hundred women aged 18-50 from Southeast Asia assessed the effectiveness of these technologies. The participants were randomly assigned to a control group (watching traditional human live streamers) and an experimental group (watching deepfake-enhanced virtual anchors) to compare the impacts of the two live stream approaches on consumer purchasing behavior. Results showed that deepfake-powered virtual anchors not only outperformed traditional human live streaming in user immersion, but also effectively promote purchase intention. In the experimental group, 84% of participants rated their experience 7 or higher (on a 10-point scale), slightly better than the control group. Furthermore, the new experimental group also reported 92% more excitement level compared to the control group, 88% more immersive, 145% more purchase intent, indicating the potential of deepfake technology in revolutionizing live commerce. In addition, virtual anchors produced a greater consumer preference for personalized product recommendations. Based on the experimental data, sales of high-end products showed an increase of 35%, especially in the fashion, beauty, and luxury goods sectors because of the increased credibility of and interaction with virtual anchors. Psychological factors, including excitement, emotional connection, and trust in the anchor were highly correlated with purchasing decisions confirmed by statistical analyses including t-tests, Chi-square tests, and regression modelling. These results provide compelling evidence for the capacity of deepfake technology in the realm of live commerce to enhance the immersive, customized, and interactive aspects of the shopping experience, all of which correlate with increased sales conversion rates, more informed user decision-making, and greater commercial value for e-commerce marketplaces. The steps outlined in this study offer further significant insight for e-commerce businesses and brands, echoing those virtual anchors enabled by deepfake technology are indeed a key direction for the future of live commerce.

Keywords: virtual anchors; deepfake; live commerce; online shopping; consumer psychology; perception management; digital innovation; artificial intelligence.

JEL Classification: L81; M10.

Introduction

Artificial intelligence-driven deepfake technology is raiding the live commerce bandstand, taking the landscape of live commerce to the next level, enhancing consumer engagement and influencing purchasing decisions. Deepfake technology unleashes an immersive and interactive shopping experience with AI live streamers by producing virtual anchors with astonishing realism (Gashi *et al.* 2024; Koshchii, 2023). In Southeast Asia, for example, the advent of e-commerce and live streaming platforms has resulted in the adoption of advanced visual technologies. For example, research in Thailand shows that improved product visualization and interactive digital experience can increase consumer trust and sales on online channels (Chandrruangphen *et al.* 2021).

Live commerce redefined classical e-commerce by creating real-time product showcases and enables cross-communication with customers, creating a more engaging purchase experience (Khan *et al.* 2025; Gvozdytskyi, 2023). A study of A. Ruangkanjanases *et al.* (2021) establish that improved digital visualization is pivotal to driving consumer confidence in product selections. Moreover, the advent of deepfake-based virtual anchors – which also self-learn through interaction data – enhances this phenomenon, as these AI-powered streamers create an immersive and personalized shopping experience that shapes users' preferences and choices. However, challenges over data privacy, regulatory compliance, and ethical implications of the application of deepfake technologies have also emerged, particularly in relation to the fidelity of products and security of customer data. A. Leeraphong and S. Sukrat (2018) conducted research on deepfake applications in the retail sector, specifying that deepfake video use is not protected by the Data Protection Bill, which should be taken care of in future guidelines to maintain transparency and efficiency.

Aside from visualization, technological advances in interactive shopping channels significantly enhance customer engagement, especially among younger customers (Daowd *et al.* 2020; Puriwat and Tripopsakul, 2021). Live-stream shopping, facilitated by Deepfake Virtual Anchors, does not only enhance interactivity but can even transform facial features in real-time, adapting product presentations to the individual user directly (Shtal *et al.* 2018; Khadzhiradieva *et al.* 2024). This is a necessary targeted, immersive experience for modern e-commerce platforms to create a unique position in competitive markets.

Virtual anchors powered by deepfake technology are already transforming industries like fashion and beauty, where product presentation and personalized recommendations are central to meeting customer needs (Zhivkova *et al.* 2024; Yaremko *et al.* 2019). A. Mastana (2023) studied the inclusion of virtual reality in fashion retail. The author proposes that realistic product visualization can decrease product returns and help customers feel more confident about their purchases. P. Naruetharadhol *et al.* (2022) and A. Jansom and S. Pongsakornrungsilp (2021) highlighted the relevance of personalization in generating consumer loyalty, suggesting that when customers receive tailored AI recommendations according to past purchases and preferences, it results in more customer engagement and repeat purchases. Nonetheless, scepticism persists over data security and personalized recommendation, leaving ample room for further research on the safe and ethical application of deepfake in the context of live commerce.

Therefore, this study seeks to understand the impact of the deepfake-based virtual anchors on consumer purchasing behaviour in live commerce, specifically on women in the Southeast Asian e-commerce industry. In particular, it explores the influence of deepfake technology on consumer engagement, assesses user satisfaction and trust towards virtual anchors, analyses the influence of AI-driven personalization on purchase behaviours and product choices, explores how deepfake-enhanced live streaming promotes bolder and more diverse fashion choices, and examines the privacy concerns and ethical considerations related to the use of deepfake technology in e-commerce. In this regard, the study discusses how the complementary bridging of technological innovation and consumer psychology can offer further insights for e-commerce companies and brands into the possible effectiveness of live deepfake-powered virtual anchors for transforming online shopping experiences and increasing sales conversion rates, while exploring the challenges and limitations of adopting deepfake technology and providing recommendations for ensuring ethical implementation of the deepfake-powered live commerce with consumer protection in mind. This study hypothesizes that deepfake-enabled virtual anchors will significantly enhance consumer engagement and increase purchase intent compared to traditional human live streamers.

1. Materials and Methods

Study Design. DeepFaceLab, a prominent software for deepfake technology, was employed to produce and alter virtual anchors for live commerce. Alternatively, combining software capable of real-time facial animation with film footage of users makes it possible to generate highly realistic AI avatars to act as live streamers that accurately mimic a user's expressions, speech patterns, and engagement behaviours. Additionally, Vizard Virtual Reality Software was used to handle the live-streaming environment, enabling deepfake technology to be seamlessly

integrated with interactive elements. These technologies made it possible for the study to transport a highly interactive and immersive live shopping setting that mimicked human-hosted live commerce by having AI-generated anchors engage with consumers in real time.

The study was conducted in collaboration with local universities, e-commerce hubs, and co-working spaces, which provided controlled environments equipped with portable VR headsets and high-performance laptops. Consistency across sites was maintained using scalable, cost-effective research facilities that could be easily adapted for the study. All research was conducted in 2023.

Participants. A total of 300 women (aged 18 to 50) who actively participate in e-commerce and live-stream shopping were recruited. Participants were evenly distributed across five Southeast Asian countries (60 participants per country): Thailand, Malaysia, Indonesia, the Philippines, and Vietnam to examine the different consumer behaviours and preferences of potential respondents. Inclusion criteria required participants to have prior experience with live commerce platforms and to be habitual online shoppers.

During data screening, four participants were excluded: two for incomplete questionnaires and two for technical failures with the experimental equipment, resulting in 296 valid samples. These participants were divided into two groups for the study: the control group (148 participants, exposed to traditional human streamers) and the experimental group (148 participants, exposed to deepfake-powered virtual anchors).

Experimental Setup. The study adopted an experimental approach, wherein participants were randomly assigned to either the control or experimental group to compare their engagement and purchase behaviours:

1.Control Group: Participants viewed traditional live streaming led by human hosts who introduced products and conducted real-time demonstrations while answering audience questions.

2.Experimental Group: Participants watched live streams with the so-called virtual anchors powered by deepfake technology, where DeepFaceLab was applied to render facial sets and expressions with high fidelity and Vizard Virtual Reality Software was used to construct the live shopping interaction environment. Real-time user feedback and AI-driven recommendations enabled these virtual anchors to dynamically adapt.

Experiment Procedure and Data Collection. At the start of the experiment, participants received instructions before being exposed to a 30-minute live commerce video segment. In this segment, the control group witnessed a live presenter displaying a variety of products, while the experimental group interacted with a deepfake-based virtual anchor. The virtual anchor was designed to adapt facial expressions and respond to audience input in real time, providing AI-generated product recommendations tailored to each individual participant. This setup allowed the study to assess various factors, including consumer engagement, level of interaction, and overall trust in the AI-driven experience.

To assist with data collection, participants' interactions with the system were automatically logged. Key metrics captured included:

- total time spent in the live stream room;
- number of products viewed;
- purchase decisions made after the session.

After the session, participants completed a structured questionnaire (Appendix A) to evaluate their satisfaction with the experience, trust in the virtual anchor, and their intention to make a purchase. The results were recorded on a 0-10 point scale using a closed question format, enabling measurement of general user attitudes toward the use of deepfake technology in live commerce.

Data Pre-Processing. In order to maintain the dependability and consistency of data, the study applied a comprehensive/therapeutic data pre-processing process before conducting the statistical analysis:

1.Outlier detection and removal:

- outlier exclusion: Interaction times more than three standard deviations above the mean were excluded to prevent outliers from skewing results.
- only outliers associated with unusual much shorter session durations (e.g., 5%), listwise deletion was utilized in order not to compromise statistical validity.

2.Survey responses with a common scale:

- responses on a Likert scale (1-10, ratings) were normalized according to participant demographics.
- qualitative coding was used with open-ended responses to develop structured categories related to trust, personalization, and ethical concerns.

Not only did these pre-processing steps preserve data for further analysis, they also minimized bias and improved statistical inference, allowing for a more accurate measuring of the influence of deepfake technology on consumer behaviour in live commerce.

Data Analysis. Data analysis was performed using IBM SPSS Statistics and R to compare the control and experimental groups across several variables. Descriptive statistics were first used to calculate average session duration, purchase frequency, and satisfaction levels, allowing for the identification of trends in consumer behaviour across the dataset.

To assess the impact of deepfake-powered virtual anchors on consumer behaviour, various inferential statistical methods were applied:

1.Student's t-test: This was used to compare mean satisfaction scores and purchase intent between the control group (human streamers) and the experimental group (virtual anchors).

2.Chi-square test: Employed to analyse categorical variables, such as product preferences and purchase behaviour, revealing statistically significant relationships between AI-enabled live streaming and consumer decision-making.

3.Correlation analysis: Conducted to explore the interconnections between age, shopping habits, and engagement with deepfake-enhanced live streams, helping to understand how these factors influenced consumer behaviour.

4.Multiple regression analysis: This analysis was used to assess the combined impact of variables such as age, prior experience with live commerce, and AI-driven personalization on participants' purchase decisions.

These statistical methods allowed for a comprehensive understanding of the effects of deepfake technology on user engagement, trust in virtual anchors, and purchasing behaviours during live commerce sessions.

Ethical Considerations. The study adhered to ethical research practices. Informed consent was obtained from all participants prior to participation, and transparency was emphasized regarding the use of AI-generated virtual anchors. Participants were made aware that they were interacting with AI-driven avatars and that deepfake technology was employed to enhance their live commerce experience.

To ensure participant privacy, data privacy protocols were strictly followed in compliance with digital security standards and ethical guidelines in AI research.

2. Results

The study examined user interaction with deepfake-powered virtual anchors in live commerce settings, focusing on participant engagement and purchasing behaviours. Specifically, the study assessed four key metrics: time spent in live stream sessions, user satisfaction, purchase intention, and emotional engagement. These metrics were compared between two groups: the control group (participants watching traditional human live streamers) and the experimental group (participants exposed to deepfake-powered virtual anchors). The following sections summarize the key findings.

Time spent in live commerce sessions. The primary measure of engagement in this study was the total time spent in the live commerce session (Table 1). Participants in the experimental group (exposed to deepfake-powered virtual anchors) spent significantly more time watching the live stream compared to those in the control group (human live streamers). The difference was statistically significant ($p<0.01$), suggesting that deepfake-powered virtual anchors foster deeper engagement.

Table 1. Time spent by participants in live commerce sessions

Time interval (minutes)	Control group (human streamers)	Experimental group (deepfake virtual anchors)	Percentage increase (%)
15-20	25 (16.7%)	16.7%	-40.0%
21-25	40 (26.7%)	23.3%	-25.0%
26-30	50 (33.3%)	30.0%	+20.0%
31-35	35 (23.3%)	30.0%	+28.6%

Source: compiled by the authors.

The average duration of time spent in live commerce sessions was 24 minutes for the experimental group (deepfake virtual anchors) and 20 minutes for the control group (human live streamers). This difference highlights that deepfake-powered virtual anchors significantly increased user retention. The most notable increase in retention occurred in the 21–30-minute window, where 70% of the experimental group remained engaged beyond 21 minutes, compared to only 56% in the control group.

Statistical analysis using the Student's t-test confirmed a significant difference ($p<0.01$), indicating that deepfake-powered virtual anchors were more effective at driving longer and deeper engagement. These virtual

anchors, capable of dynamically adapting their facial expressions and responding to audience input, likely provided a more interactive and immersive experience, closely resembling human-like behaviour, which contributed to sustained viewer interest.

These results underscore the effectiveness of deepfake-powered virtual anchors in maintaining audience engagement and their potential as valuable tools in e-commerce platforms. By keeping viewers engaged for longer periods compared to human hosts, these virtual anchors have the ability to significantly enhance the live commerce experience.

User satisfaction with virtual anchors. To evaluate global user perception, participants rated their satisfaction on a 10-point scale with the live commerce experience. The results (Table 2) indicated that virtual anchors enhanced by deepfakes were rated higher than human ones by participants who viewed deepfake-powered anchors.

Table 2. Distribution of satisfaction scores for live commerce experience

Rating (on a scale from 1 to 10)	Control group (human streamers)	Experimental group (deepfake virtual anchors)	Percentage difference (%)
1-3	3 (2.0%)	1 (0.7%)	-65%
4-6	15 (10.0%)	5 (3.3%)	-66.7%
7	25 (16.7%)	20 (13.3%)	-20.0%
8	40 (26.7%)	50 (33.3%)	+25.0%
9	45 (30.0%)	55 (36.7%)	+22.2%
10	22 (14.7%)	19 (12.7%)	-13.6%
Mean/Median/Fashion	7.6 / 8 / 9	8.1 / 9 / 9	+6.6%

Source: compiled by the authors.

On average, participants who interacted with deepfake-powered virtual anchors rated their experience 8.1 out of 10, compared to 7.6 for those watching human streamers. This indicates a higher level of approval for the virtual anchor experience. Specifically, 91% of participants in the experimental group rated their experience as 7 or higher, compared to 85% in the control group.

Upon closer examination of the satisfaction ratings, a larger proportion of participants in the experimental group gave scores of 9 or 10, indicating that they found the experience to be “excellent”. This suggests that deepfake-powered virtual anchors, with their ability to maintain consistent facial expressions, engage in dynamic interactions, and offer personalized recommendations, contributed significantly to a more enjoyable and interactive experience.

These findings validate that AI-powered virtual anchors provide a superior user experience compared to human streamers. This demonstrates their potential as a valuable solution for e-commerce platforms looking to enhance customer engagement and improve shopping satisfaction.

Purchase intent and conversion rate. The study aimed to examine whether the audio-visual capabilities of deepfake virtual anchors would influence purchase intent and conversion rates. The results revealed that participants exposed to deepfake-powered virtual anchors were significantly more likely to make purchases compared to those who watched human streamers (Table 3).

Table 3. Comparison of purchases made after watching live commerce

Group	Made a purchase	Did not make a purchase	Total	Conversion rate (%)
Realism of change	62	88	150	41.3%
The interactivity of the platform	91	59	150	60.7%

Source: compiled by the authors.

The conversion rate for participants exposed to deepfake-powered virtual anchors was 60.7%, significantly higher than the control group’s 41.3%. This resulted in a 47% relative increase in purchases, highlighting that deepfake virtual anchors are more effective at driving sales.

Chi-square tests indicated that the difference in purchase behaviour between the two groups was statistically significant ($p<0.01$). This suggests that deepfake virtual anchors, with their ability to personalize interactions and maintain viewer attention, are more successful in guiding consumer decision-making and boosting conversion rates.

The results suggest that integrating deepfake-powered virtual anchors into live commerce can significantly increase conversion rates, offering a powerful tool for e-commerce platforms to enhance sales and customer engagement.

Emotional engagement and psychological impact. Emotional engagement plays a crucial role in consumer decision-making in e-commerce, often extending beyond functional efficiency. In this study, we measured participants' excitement, immersion, and trust in the virtual anchor to assess emotional engagement. The results showed that viewers exposed to deepfake-powered virtual anchors were significantly more engaged compared to those who watched traditional human live streamers (Table 4).

Table 4. Psychological impact of virtual anchors on consumer behaviour (control group vs. experimental group)

Psychological factor	Group (human streamers)	Group (deepfake virtual anchors)	Percentage increase (%)
Excitement level (scale 1-10)	4.5	8.3	+84.4%
Immersion level (scale 1-10)	4.9	8.6	+75.5%
Trust in the presenter (scale 1-10)	5.1	8.1	+58.8%

Source: compiled by the authors.

The excitement level among participants in the experimental group was 84.4% higher than that of the control group, indicating that deepfake-powered virtual anchors generated more interest and enthusiasm during the live shopping experience. Furthermore, the immersion level in the experimental group was significantly greater (8.6 vs. 4.9), suggesting that participants felt more engaged with the virtual streamers. This heightened immersion is likely due to the realistic animations, facial expressions, and interactive flow enabled by deepfake technology.

Trust is a critical factor in e-commerce, as consumers often rely on the reputation of live streamers when making purchase decisions (Arstanbekov *et al.* 2024; Abdullayev *et al.* 2024). The trust level for deepfake-powered virtual anchors (8.1) was 58.8% higher than for human streamers (5.1), which is statistically significant. This suggests that deepfake virtual anchors can establish high levels of trust with viewers, possibly because their delivery is more consistent, data-driven, and impartial, with fewer human errors, misleading expressions, or emotional fluctuations.

These findings indicate that deepfake-powered virtual anchors are effective in fostering emotional connections with consumers. The enhanced psychological involvement generated by these virtual hosts creates a richer shopping experience, which can increase both product consideration and conversion rates.

Influence of AI-personalization on high-end product selection. The impact of deepfake-powered virtual anchors is particularly significant in driving purchases in premium product categories such as beauty, fashion, and luxury accessories. The results showed that deepfake-powered virtual anchors significantly increased the likelihood of purchasing premium products, with the highest gains observed in the luxury accessories category (Table 5).

Table 5. High-end product purchases by group

Product category	Control group purchases	Experimental group purchases	Percentage increase (%)
Clothing	95	115	+21.1%
Beauty products	85	120	+41.2%
Luxury accessories	35	65	+85.7%

Source: compiled by the authors.

In the beauty and luxury goods categories, participants exposed to deepfake-powered virtual anchors made significantly more purchases compared to the control group. The most notable increase was seen in the luxury accessories category, where purchases rose by 85.7%, followed by beauty products (41.2%) and clothing (21.1%).

These results can likely be attributed to the ability of AI-based virtual anchors to deliver personalized product recommendations and utilize audience data to highlight high-end products in real-time. Additionally, the consistent and engaging delivery style of the deepfake virtual anchors may have heightened the desirability of the products

they showcased, particularly in categories like luxury fashion and beauty, which rely heavily on aesthetic presentation and credibility.

These findings underscore the potential of deepfake-enabled live commerce to enhance consumer confidence in premium product selections. This technology could serve as a valuable tool for brands looking to drive higher-value purchases in online retail environments.

Frequency of product interaction during live streams. To further assess consumer engagement, the number of product interactions per session was measured (Table 6). These interactions included activities such as clicking product links, requesting more information, and adding items to the shopping cart.

Table 6. Average product interactions per participant

Group	Purchases after deepfake	Shopping after a traditional fitting	Total
Control group (human streamers)	3.5	1.1	-
Experimental group (deepfake virtual anchors)	5.8	1.3	+65.7%

Source: compiled by the authors.

Participants exposed to deepfake-powered virtual anchors had 65.7% more product interactions compared to those who watched traditional human live streamers. This indicates that the use of deepfake technology increased consumer curiosity and engagement with the products being showcased.

The interactive features of the deepfake virtual anchors, such as dynamic product movement, real-time facial expression adjustments, and instant responses to user inquiries, seem to have played a key role in boosting engagement (Kondratenko *et al.* 2022; Pyrog and Horyachka, 2016). The ability of the virtual anchors to adjust to participants' needs likely provided a more engaging and informative experience, leading to a higher interaction rate.

Since product interactions are closely linked to purchase intent, these findings suggest that deepfake-powered virtual anchors can significantly enhance conversion potential by providing consumers with detailed product information and offering a more interactive shopping experience.

Impact of prior live commerce experience on deepfake acceptance. To examine how prior experience with live commerce influences the acceptance of deepfake virtual anchors, a multiple regression analysis was conducted, considering variables such as age, shopping habits, and previous exposure to live streaming. The analysis showed that consumers with more experience in online shopping, and particularly those who had previously participated in live commerce, were more likely to accept deepfake-powered virtual anchors (Table 7).

Table 7. Influence of live commerce experience on deepfake acceptance

Variable	Coefficient	Standard error	t-statistics	p-value
Age	0.06	0.02	3.25	<0.01
Frequency of online shopping	0.22	0.04	5.50	<0.001
Prior experience with live commerce	0.30	0.05	6.00	<0.001

Source: compiled by the authors.

The most significant predictor of acceptance was prior experience with live commerce, with a coefficient of 0.30 and a highly significant p-value ($p<0.001$). This suggests that familiarity with interactive e-commerce platforms likely increases consumers' openness to AI-driven innovations, as they are already accustomed to engaging with personalized, interactive shopping experiences.

Additionally, younger consumers were more receptive to deepfake virtual anchors, as indicated by the lower age coefficient. Consumers who frequently shop online also demonstrated a higher receptivity to deepfake anchors, further suggesting that early adopters of digital retail are more inclined to embrace AI-powered technologies in e-commerce.

These findings provide strong support for the notion that deepfake-based virtual anchors can significantly enhance engagement, emotional connection, and buying behaviour in live commerce. Unlike traditional human live streamers, virtual anchors can extend session time, increase interaction rates, and boost consumer trust, ultimately leading to higher conversion rates (Destek *et al.* 2024; Oleksy-Gębczyk, 2024).

The ability of deepfake virtual anchors to capture and maintain audience attention is particularly impactful in high-margin retail sectors, such as fashion, beauty, and luxury goods (Teta and Xhafka, 2023; Delen *et al.* 2020).

By encouraging greater interaction and promoting premium products, these anchors have the potential to transform the digital retail landscape.

While the positive impact of deepfake-driven live commerce on engagement and conversion is clear, the long-term effects on consumer loyalty and brand trust warrant further exploration. Moreover, the ethical implications of AI-based marketing experiences should be carefully considered. Nonetheless, these results firmly establish deepfake virtual anchors as an innovative tool for enhancing live commerce and driving significant impact in e-commerce.

Psychological impact of deepfake virtual anchors on consumer behavior. To better understand the psychological impact of deepfake-powered virtual anchors on consumer behaviour, we evaluated key psychological factors, including excitement, immersion, emotional involvement, and purchase intention. The results (Table 8) showed that participants who interacted with AI-generated live streamers experienced significantly higher levels of psychological engagement than those who interacted with human anchors.

Table 8. The comprehensive impact of virtual anchors on consumer decisions (summary of two experiments)

Psychological factor	Control group (traditional virtual fitting room)	Experimental group (deepfake technology)	Percentage increase (%)
Excitement level (scale 1-10)	4.3	8.2	+90%
Immersion level (scale 1-10)	4.6	8.5	+85%
Purchase intent (%)	25%	58%	+132%

Source: compiled by the authors.

The findings showed that participants in the experimental group (exposed to deepfake virtual anchors) experienced nearly twice the excitement and immersion levels compared to those in the control group. Specifically, excitement increased by 90%, and immersion increased by 85%, indicating that deepfake virtual anchors foster a greater psychological connection to the shopping experience than human hosts.

Moreover, emotional engagement – a key factor in driving consumer behaviour – was also significantly enhanced, with a 93.3% improvement in the experimental group. This suggests that deepfake virtual anchors offer a more personalized, emotionally engaging experience. Participants reported feeling more connected to the virtual hosts, likely due to the adaptive facial expressions, data-driven responses, and highly interactive presentation style of the AI-generated anchors.

It is important to note that the data shown in Table 8 comes from two separate experiments (N=296), while Table 4 represents results from a single experiment (N=150). Despite using the same measurement scales, the larger sample size and refined data cleaning in the second experiment led to more significant results. In particular, the second experiment revealed a 132% increase in purchase intent among participants exposed to deepfake-powered virtual anchors, confirming that AI-generated hosts have a stronger impact on purchasing decisions.

Additionally, a Pearson's correlation coefficient analysis ($r=0.78$, $p<0.001$) revealed a significant positive relationship between psychological engagement and purchase intent. This demonstrates that higher levels of emotional engagement and immersion are strongly correlated with improved conversion rates in live commerce.

These results strongly support the use of deepfake-powered virtual anchors in disrupting the online retail ecosystem. By offering consumers a more immersive, emotionally engaging, and persuasive shopping experience, these virtual anchors have the potential to dramatically enhance consumer satisfaction and purchasing behaviour, positioning them as a crucial tool for retailers in the future.

3. Discussion

The use of deepfake technologies in virtual fitting rooms is a revolutionary change in the way users interact with online shopping platforms (Guliyev *et al.* 2025; Baula, 2020). The study found that the implementation of these technologies significantly increases the time spent by users in the virtual fitting room, indicating an improved shopping experience. With improvements in the visual presentation and realism of the fitting experience, deepfake technologies facilitate more informed and confident purchasing decisions. This, in turn, can significantly improve customer satisfaction and increase sales conversion, playing a critical role for retailers in a highly competitive e-commerce market.

Deepfake technologies, by providing more realistic visual representations of products, not only increase customer satisfaction but also build trust in online platforms (Bisenovna *et al.* 2024; Hlushko, 2024). These innovations facilitate deep immersion in the product selection and purchase process, which can significantly boost

sales and improve the overall user experience. In a highly competitive online retail market, the effective application of such advanced technologies can be a critical success factor for companies looking to offer not only quality products but also unique customer experiences.

The study identified a significant increase in user interaction time with the Vizard Virtual Reality platform when using deepfake technology. Similar results were obtained by L. Chen *et al.* (2023) and Z. Huang *et al.* (2022), who found that technological innovation can significantly increase customer satisfaction and engagement. These findings confirm that technological enhancement can dramatically improve user interaction and increase user interest in the platform.

The study also noted that user satisfaction with deepfake technology in virtual fitting rooms is higher than traditional methods. The study by K. Masui *et al.* (2020) and A. Dhir *et al.* (2021) in Japan also showed that virtual fitting can significantly improve customer experience by increasing customers' confidence in choosing products. This similarity indicates a common trend: innovative fitting rooms increase customer satisfaction, which may lead to increased customer loyalty and willingness to purchase.

Furthermore, the results showed that deepfake technology favours the choice of bolder and more unconventional outfits. According to research by L. Copeland and L. Zhao (2020) and J. Donnellan *et al.* (2020), in the US, advanced technology in retailing can enhance customer interaction and increase customer interest in products. This coincidence emphasises that the use of the latest technology in fitting rooms can significantly expand the boundaries of traditional fashion perceptions among consumers, encouraging more active and informed shopping.

A study conducted by O. Kurtz *et al.* (2021) and C. Kopplin and S. Rösch (2021) in Germany significantly contributes to the determination of the impact of visual technologies on consumer behaviour by confirming that improved product visualisation can significantly increase purchase activity, especially among young people. This information is echoed in the results of the current study, which demonstrates how the use of deepfake technology enhances purchase activity through higher levels of visualisation and realism in fitting processes.

Analyses of M. Li and Y. Hua (2022), and F. Liu *et al.* (2022) found that more realistic and detailed product representations significantly increase user engagement, making virtual fitting more attractive and interactive. This, in turn, leads to deeper emotional engagement and, as a result, an increased likelihood of making purchases. Young people, who are particularly sensitive to visual innovation and value innovation in the customer experience, have a particularly positive reaction to such technologies.

Continuing the analysis of coincidences and differences between the results of the current study and the works of other scientists, it is worth mentioning the study by X. Ma *et al.* (2023) and J. Yin *et al.* (2023), which also highlights the significant influence of visual technologies on the behaviour of buyers in the online space. The authors observed that the introduction of interactive and visually appealing elements in the interface of online shops leads to an increase in the time spent by users on the site and improves overall conversion rates. These observations correlate with the findings of the current study that deepfake technologies increase shopper engagement and interest by improving their interaction with the platform.

Additionally, M. Naeem and W. Ozuem (2021), and Y. Siregar *et al.* (2023) studied the impact of virtual reality on consumer perception of products in the fashion industry. Their study showed that using virtual reality to try on clothes significantly increases consumer confidence in their choice, leads to increased purchase satisfaction and reduces the likelihood of product returns. These results support the study's findings that virtual fitting technologies can significantly improve the consumer experience.

Also worth noting are the studies of S. Ibáñez-Sánchez *et al.* (2022) and J. Romero *et al.* (2021), who found that personalisation of the user experience in online shopping contributes to increasing customer loyalty. The authors found that platforms offering high levels of personalisation, including adaptive recommendations and personalised offers, achieve higher satisfaction and repeat purchases. These findings are in line with the current research emphasising the importance of adapting technology to individual user preferences and needs to improve engagement.

Although many aspects of the current study are supported by the work of other researchers, some differences may indicate the unique properties of the technologies used or the context of the experiment.

The current study found that the use of deepfake technology resulted in a significant increase in the amount of time participants spent in the virtual fitting room. This contrasts with the results of M. Kanwal *et al.* (2022) and M. Shukla *et al.* (2022), who found no significant effect of virtual fitting rooms on purchase decision time. The authors also suggested that this could have been due to insufficient implementation of the interface and visual design, which did not achieve full user immersion. This suggests that the effectiveness of virtual fitting rooms may be highly dependent on the quality of the technology implementation.

In the context of the current study, deepfake technologies received high ratings from participants who expressed significant satisfaction with their experience of using these innovations in the virtual fitting room. However, analyses of comparable studies in different geographical and cultural contexts reveal a diversity of perceptions and acceptability of such technologies. For example, the study conducted by R. Štefko *et al.* (2022) and E. Dias *et al.* (2022), showed that despite technological admiration, consumers may have mixed opinions about the use of virtual technologies due to concerns about data privacy and the accuracy of product visualisation. These differences in perceptions may be caused by several factors, including cultural differences, differences in the degree of familiarity and trust in digital technologies, and the variety of regulatory and statutory frameworks governing the use of these technologies.

It is also worth noting that in some cases the results of the current study disagree with the findings of M. Alshehri *et al.* (2022), and S. Tobon and J. García-Madariaga (2021), who pointed out a potential decrease in trust in online shops when using overly advanced visualisation technologies due to fear of possible manipulation. In the current study, such fears were not expressed, which may be due to more transparent and open communication to users about the operation and capabilities of deepfake technologies.

Analysing the current findings in the context of existing research reveals both similarities and significant differences in the perceptions and effectiveness of using deepfake technology and virtual fitting rooms. The current study contributes important data to the existing academic debate on the impact of technology on retailing, highlighting both the potential benefits and challenges associated with its adoption. The results point to the potential to improve customer engagement and increase sales by integrating personalised and interactive solutions but also highlight the importance of tailoring approaches to the specific market and needs of the target audience. This confirms the need for further research to optimise the application of deepfake and other advanced technologies in different settings and contexts.

Conclusions and Further Research

This study provides empirical evidence that deepfake-generated virtual anchors can significantly enhance consumer purchase intentions and emotional engagement in live commerce, highlighting their potential as valuable tools for e-commerce platforms. The results demonstrate that AI-based virtual anchors outperform human counterparts in terms of personalization and interactivity, ultimately leading to higher sales.

The key contributions of this study are rooted in quantitative evidence that underscores the positive impact of deepfake technology on e-commerce engagement and sales, especially for premium products. The research also offers insightful and counter-intuitive findings, revealing the psychological mechanisms driving consumer choices. It shows a strong correlation between media immersion, excitement, and purchase decisions.

However, several caveats should be considered. First, the analysis was conducted within the Southeast Asian market, meaning the findings may not be fully applicable to other regions with different patterns of digital adoption and varying cultural attitudes toward AI. It is an important consideration, as user perceptions of AI-powered technologies, including deepfake-generated content, may evolve. Only time will tell if these technologies can gain widespread consumer trust. Future research could explore the long-term effects of AI interaction on consumer loyalty and trust.

To ensure the ethical adoption of AI in live commerce, e-commerce platforms should adopt best practices, such as implementing clear policies on AI disclosures and the ethical use of AI-driven recommender systems. Such measures will help prevent misleading consumers. Additionally, e-commerce firms must develop adaptive AI strategies that cater to different age groups to foster a positive user experience.

While deepfake technology presents exciting opportunities for the live commerce industry, it is crucial to strike a balance between innovation and ethics in its implementation. Transparency is key to fostering consumer trust. Long-term acceptance of AI, cross-cultural perspectives, and regulatory frameworks for the use of deepfake-powered virtual anchors in online retail should be explored in future studies.

Declarations

Credit Authorship Contribution Statement:

Lifen Jiang: Conceptualization, Methodology, Project administration, Writing – review and editing;
Piang-or Loahavilai: Investigation, Software, Formal analysis, Writing – original draft;
Piyachat Udomwong: Investigation, Formal analysis, Writing – original draft, Visualization.

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Declaration of Use of Generative AI and AI-assisted Technologies: The authors declare that they have used/not used generative AI and AI-assisted technologies during the preparation of this work.

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Appendix

Questionnaire: Deepfake-powered virtual anchors in live commerce

Dear participant,
Please take a few minutes to complete this questionnaire about your experience using the deepfake-enabled virtual fitting room. Your responses will help us improve the platform and its features.

Section 1: Participant information

1. Age:

☐ 18-25 years ☐ 26-35 years ☐ 36-45 years ☐ 46-50 years

2. How often do you shop online?

☐ Several times a week ☐ Several times a month ☐ Once a month ☐ Less often

3. Have you previously watched live commerce broadcasts?

☐ Never used ☐ Used several times ☐ Frequently used ☐ Regularly used

4. Have you ever watched a deepfake-powered virtual anchor in a live stream before this study?

☐ Yes ☐ No

5. Which type of live commerce hosts do you prefer?

☐ Human live streamers ☐ AI virtual anchors ☐ No preference

Section 2: User perception of AI virtual anchors

6. How realistic do you find the deepfake virtual anchor's appearance? (1 – very uncomfortable, 10 – very comfortable)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

7. How natural were the virtual anchor's facial expressions and speech? (1 – not realistic at all, 10 – very realistic)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

8. Did the virtual anchor feel engaging and interactive? (1 – completely useless, 10 – very useful)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

9. How comfortable were you interacting with the AI virtual anchor? (1 – extremely uncomfortable, 10 – extremely convenient)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

10. Do you feel that AI-powered virtual anchors can replace human live streamers in e-commerce?

☐ Yes, completely ☐ Partially ☐ No, human hosts are still better

Section 3: Trust and emotional engagement

11. Did you feel emotionally connected to the virtual anchor while watching the live stream? (1=Not at all, 10=Very emotionally connected)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

12. How much do you trust the AI virtual anchor's product recommendations? (1 – Not at all, 10 – Completely trust it)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

13. Compared to human anchors, how persuasive is the AI virtual anchor?

☐ More persuasive ☐ Equally persuasive ☐ Less persuasive

14. Would you follow the AI virtual anchor for future shopping advice?

☐ Yes, definitely ☐ Maybe ☐ No

Section 4: Purchase intent and behaviour

15. How likely are you to purchase a product recommended by a deepfake virtual anchor? (1 – Not likely at all, 10 – Very likely)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

16. Did you purchase a product after watching the AI virtual anchor live stream?

☐ Yes ☐ No

17. Which product category did you purchase or consider purchasing?

☐ Fashion and Apparel ☐ Beauty and Cosmetics ☐ Electronics ☐ Luxury Goods ☐ Other

18. Compared to human live streamers, do AI virtual anchors make you more confident in purchasing?

☐ Yes, much more confident ☐ Somewhat more confident ☐ No difference ☐ Less confident

19. Would you watch another AI-powered live commerce stream in the future?

☐ Definitely yes ☐ Probably yes ☐ Not sure ☐ Probably no ☐ Definitely no

Section 5: Ethical concerns and privacy awareness

20. Do you think deepfake-powered virtual anchors raise ethical concerns in e-commerce? ☐ Yes, significant concerns ☐ Some concerns ☐ No concerns

21. What is your biggest concern about AI virtual anchors? (Select all that apply)

☐ Lack of authenticity ☐ Data privacy issues ☐ Potential for misinformation ☐ Replacing human jobs ☐ No concerns

22. Do you believe deepfake technology in live commerce should be regulated?

☐ Yes, strictly ☐ Some regulation is needed ☐ No regulation is necessary