

Balancing Technology and Human Interaction in Virtual Exhibition Design: A Systematic Review of Feasibility Standards for Product Promotion

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Abstract. This systematic literature review (SLR) synthesizes current evidence on the feasibility of virtual exhibitions (VEs) for product promotion, with a focus on key dimensions of utility, usability, and user-exhibitor interactivity. Following PRISMA guidelines, 29 empirical studies published between 2019 and 2021 were identified from six academic databases and analyzed using narrative synthesis. The review found that an effective VE should meet 11 sub-standards across two main categories. These criteria were in turn applied thematically to the selected data with special reference to making a VE both implementable as well as appearing ‘real’: (1) utility and usability, including factors such as tool sophistication, virtual space design, product display, effectivity, learnability, satisfaction, and memorability; and (2) user-exhibitor interactivity, including virtual assistance, conversational features, social presence, and psycho-linguistic factors. The findings highlight the importance of balancing technological features with both the user experience and humanistic interaction in VE design. However, more research is required to explore the long-term impacts and economic viability of VEs, as well as the role of emerging technologies such as artificial intelligence (AI). Practical implications and future research directions such as an investigation into AI’s contemporary cultural appropriateness for the Indonesian social context are raised.

Keywords: utility and usability, user exhibitor interactivity, virtual exhibition

1. Introduction

Since the first outbreak of COVID-19 in January 2020, many face-to-face events have been reshaped into virtual events. Events for exhibiting products and/or works are no exception. From their first introduction, VEs have been considered an effective avenue for exhibiting products as they can reach members of the public who otherwise lack access to a physical location. This rapid transition between implementation and understanding of VE technology together with VE's commercial potential has exposed a research gap that this review aims to address. In particular, the nexus between technological function and changing human need is represented or unclear in the current literature. This novel analysis is timely given the rapid development of AI and its potential to transform VE platforms.

Since global Covid 19 restrictions have been lifted around the world, VE platforms have rapidly developed with a perceived orientation toward 'need'. In Hong Kong, for example, the virtual platform 'eventXtra' was launched to facilitate important events, including exhibitions. This application enables users to attend an exhibition virtually as they would otherwise do offline. It even allows members of the public to consult and interact with a stand guide over the course of an exhibition (Beribe, 2020). In Indonesia, a comparable application named 'virtualevent.id' has likewise been developed. As with eventXtra, the basic concept behind virtualevent.id is to transmute the live consumer experience into a digital environment (Widhiyanto, 2020). Notably, the Indonesian-developed platform comes with a virtual exhibition 3D display, integrated with virtual reality technology, with the capability to display a 360° space (Khairunnisa et al., 2021).



Fig. 1: Virtual reality images presenting a real store atmosphere
Source: <https://www.shopify.com/retail/digital-virtual-showroom>.

Significantly, Edgar (2002) mentioned several other advantages of VEs. For example, they can reach greater audiences on a global scale around the clock (both synchronously and asynchronously); they provide a chat feature for communication between exhibitor and user; and they provide information on the physical locations of products offered and exhibited. Yet, VEs also have several disadvantages. For example, visitors cannot directly compare one product against a similar product; the conversation process from a physical to digital form reduces quality understanding in terms of color, shape, and texture; it is difficult to facilitate human interactions between user and exhibitor during an exhibition as this is only mediated by the mouse or touch pad; and virtual exhibitions do not allow for complete involvement of the senses i.e., it is not possible to gain direct sensory and emotional experiences virtually. This is unfortunate because visitors come to a product launch room voluntarily with the motivation to enjoy an exhibition utilizing all their senses.

Since the outbreak of COVID-19, VEs have become the preferred alternative to conventional exhibitions. However, as a medium for communicating creativity (i.e., in the form of products and works), VEs largely reduce the effectiveness of messaging otherwise designed to engage users (Kim,

2018). Given such a situation, this research has identified the supporting factors of VE success in delivering messages and or information as well as facilitating effective interactivity between user and the products being sold.

The feasibility dimensions of a virtual exhibition encounter several issues faced by users, including: (1) Device Limitations. The performance of virtual exhibition applications can be hindered by the limitations of users' devices, especially when compounded by unstable internet connections; (2) Content Display and Interaction. It is challenging to replicate the display of product content and the interaction between sellers and buyers in a virtual environment; (3) User Experience: Users often face difficulties accessing virtual exhibitions in an easy and intuitive manner. Complex and non-user-friendly navigation can further reduce user interest; (4) Data Security Concerns. There are significant concerns regarding data security, data breaches, user privacy, and cyber-attacks. This research is needed to identify appropriate indicators to evaluate the effectiveness and impact of virtual exhibitions, as these factors often require different approaches compared to physical exhibitions

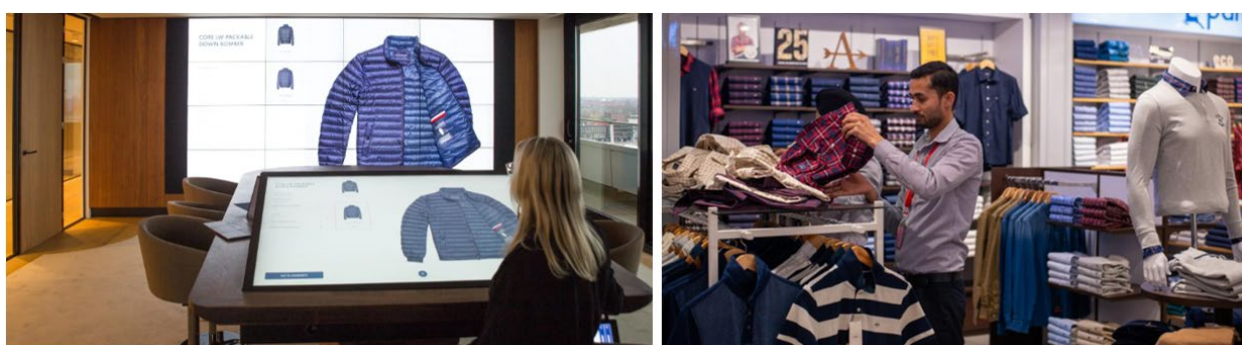


Fig. 2: Emerging problems experienced by a buyer in the virtual world.

Source: <https://www.shopify.com/retail/digital-virtual-showroom> and

<https://www.tatacapital.com/blog/loan-for-business/how-to-start-a-clothing-brand-in-india/>

In the above first example, challenges emerge when a potential buyer cannot feel the quality of the fabric and interact directly with the seller. For this reason, VEs must be able to successfully facilitate the needs of prospective buyers in cyberspace. The second image illustrates the difference between virtual and direct experience when choosing a product. The current society faces challenges in adapting to new shopping patterns through virtual exhibitions. Many individuals are still unfamiliar with this concept, particularly because they must conduct transactions without the ability to physically experience or try the products. The differences in shopping patterns compared to the pre-pandemic period warrant further investigation. The effectiveness of virtual exhibition media needs to be assessed using appropriate indicators to facilitate contactless transactions, given the risk of Covid-19 exposure.

Until now, the challenge of mapping criteria for virtual exhibitions has not been addressed in the academic research. Mapping is required to enrich the discourse of digital marketing (theoretically) and assist business practitioners navigate the digital ecosystem (practically). Moreover, this research is also novel in that it focuses on the interactivity dimension as well as persuasive humanistic communication. Hence, the aim of this research is to develop a VE feasibility standard that enables message delivery and participant treatment similar to a face-to-face exhibition. This paper therefore addresses the following two interrelated research questions:

- 1) What are the key design features and factors that influence the persuasiveness and interactivity of VEs for product promotion?
- 2) How can interactive and humanistic communication in virtual exhibitions be facilitated?

Comprehensively answering these questions serves as a reference point for both academics and commercial practitioners with an interest in market digitization, human-computer interaction, and virtual shopping trends. This contribution is significant because rapidly evolving post-pandemic trends

are for most transactions and interactions to occur digitally in virtual spaces.

2. Materials and Method

2.1. Study design and search strategy

This SLR was focused on the feasibility of VEs in meeting both users' and exhibitors' needs. It employed the PRISMA framework for systematic literature review (prisma-statement.org). Research stages are illustrated in Figure 3.

A literature search was conducted on six reputable databases to obtain current data regarding effective VEs' use and experiences along with their corresponding determinant factors. The paper search was conducted in two stages during 2001 from November 6 to November 8 and focused on the following six databases: ScienceDirect, Springer, Taylor and Francis, Sage, Wiley, and Emerald. Notably, these six databases were chosen because of their international reputation for publishing credible research findings. Therefore, these six journal databases support the recognition, quality, and impact of the authors' research. Consequently, for an article to be included in this review, it must fulfill the inclusion criteria in Table 1.

Table 1. Inclusion criteria

Criterion type	Inclusion criteria
Topic	The topic must be relevant to and consistent with the review questions and objectives.
Research base	The article must be based on empirical research (either qualitative or quantitative).
Currency	The article must be published within the last three years (2019–2021) with consideration to the increased number of virtual events held during this period (towards and during the COVID-19 pandemic). This inclusion criteria and timeframe are deliberately narrow. This paper has rather focused on a period of rapid transformation in VE platform technology and applicability directly resulting from 'need' i.e the COVID 19 pandemic.
Transparency	The article must present its methodology and findings explicitly.
Type of literature	The article must be a peer-reviewed journal publication. Literature in the form of a book chapter, newspaper article, or editorial were not reviewed, but rather considered as a source of background information.

Literature inclusion criteria stages are visualized in Figure 1. In the first stage, the keywords 'virtual exhibition', 'virtual event', and 'digital communication' were utilized. The initial search, which was conducted by scanning both titles and abstracts, yielded 154 papers; 16 of which met the inclusion criteria. In the second stage, snowball sampling was conducted by inspecting the reference section of the selected 16 papers, yielding an additional 13 papers. Consequently, in this study, 29 papers were ultimately reviewed.

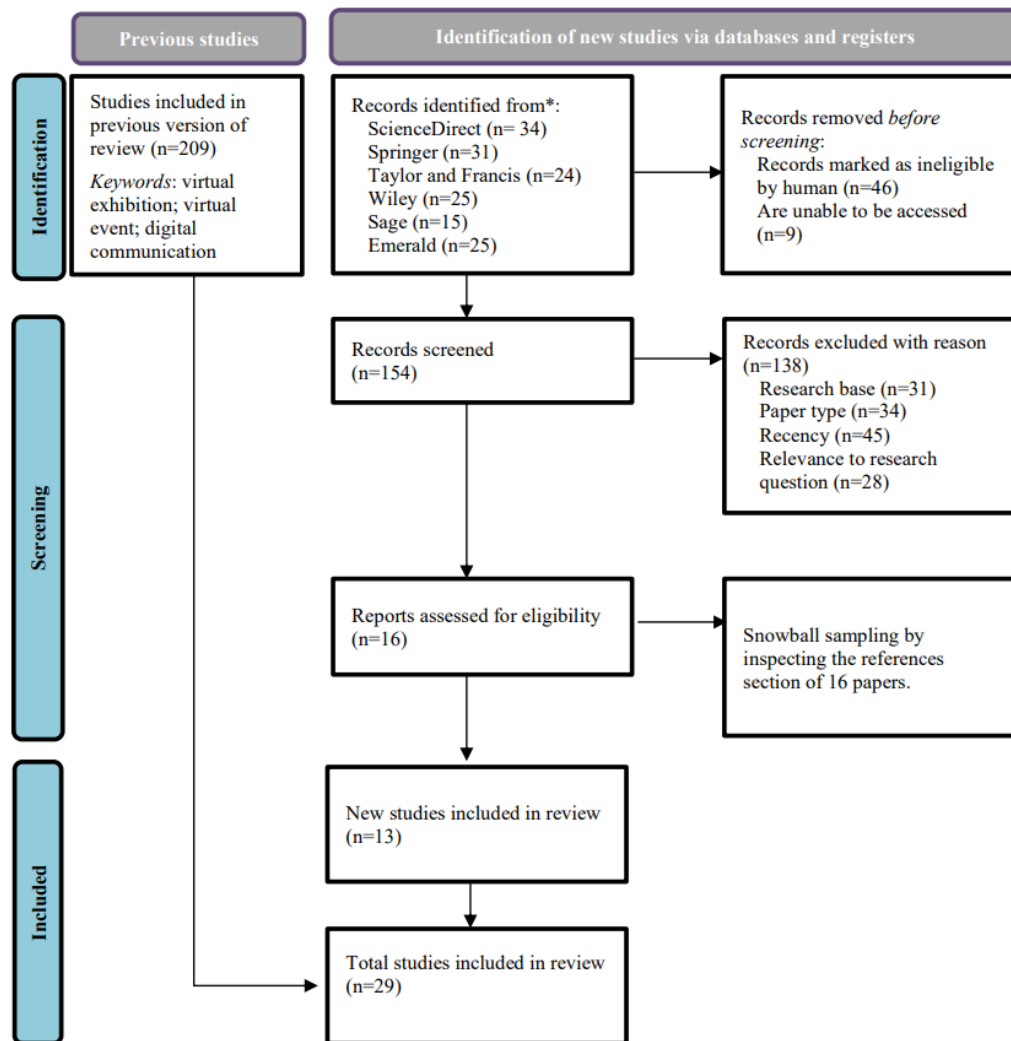


Fig. 3: Stage of PRISMA method adopted in the review

2.2. Relevance and quality appraisal

The research team evaluated each study in terms of the following criteria: (1) the trustworthiness of the results judged by the quality of the study within the accepted norms for undertaking the research design employed in the study (methodological quality) and (2) the appropriateness of the use of that study design for addressing research questions (methodological relevance). One reviewer completed the title scanning. Two reviewers then independently reviewed abstracts for methodological rigor and relevance i.e research significance, methods, data quality and availability, appropriate referencing presentation and key points. Disagreements on article quality were resolved by utilizing a third appraiser and engaging with consensus. Deliberation with a view towards consensus is a dialogical effort that accommodates all interests, equal opportunities in communication, and provides space for positive reciprocal contributions. No formal assessment of publication bias was conducted as this systematic review does not constitute a combined effect size. Therefore, the potential effect on the reliability of results is considered limited.

2.3. Data extraction and analysis

Data was extracted from articles that met the inclusion criteria. The following data sets were collected from each article: author(s), publication year, research objective(s), methods, and main findings. This research employed the Narrative Empirical Synthesis (EPPI-Centre, 200) in the synthesis for integrating the mapping results of the findings.

Integration was conducted by reorganizing and categorizing each finding from each article thematically (See Tables 2 and 3). Thematic analysis was carried out following steps introduced by Miles and Huberman representing qualitative data analysis procedures. This included data condensation, data display, and conclusion drawing. Data condensation is the reduction of data according to relevance; data display is the visual presentation of data; and conclusion drawing is the affirmation of findings from each data presentation.

3. Results and Discussion

This review revealed numerous findings which confirm the principle that the more authentically a user enjoys a VE, the more feasible is the VE as a substitute for face-to-face events. Various studies on EX in the last two years also confirmed that the pandemic has indirectly popularized VEs as a digital marketing trend. Farah et al. (2019) offered one of the most convincing findings, that the more enabled the user is to touch, hear, and feel the exhibition environment, the higher the potential of VEs to challenge the necessity of face-to-face events.

Based on the results of the above research, virtual environments help consumers consider exhibited products remotely and decide whether or not to make a purchase. In other words, VEs have the potential to help achieve the ultimate exhibition goal, i.e., sales. The main objectives of VEs are to build trust and a comfortable shopping experience and to explore the virtual market whose end point is a purchase transaction. This review presents a summary of the VE feasibility standard based on findings from 29 empirical studies. This study maintains that a VE is feasible if it meets 11 feasibility sub-standards and facilitates positive human user-exhibitor interactions. Interpretations of the 11 sub-standards are presented thematically in the following sub-sections.

3.1. Utility and usability of VEs

This review elaborates on the utility dimension in three sub-dimensions (i.e., tools, virtual space, and product display). Meanwhile, the usability dimension is explained in four sub-dimensions (i.e., effectivity, learnability, satisfaction, and memorability) (See Table 2). The ‘tools sub-dimension’ concerns the specifications of the devices required. The ‘virtual space sub-dimension’ is concerned with how a virtual environment should be designed to ensure users have a high degree of comfort in exploring exhibited products as though they were attending in-person events. The ‘product display sub-dimension’ explains how a product should be displayed. ‘Sub-dimension’ concerns the factors that determine the users’ decision-making process. The ‘learnability sub-dimension’ concerns what new experiences users may gain from visiting a VE, thereby increasing engagement. The ‘satisfaction sub-dimension’ explains the variables of satisfaction that users derive from their visit. Lastly, the ‘memorability sub-dimension’ concerns a users’ cognitive response that in turn facilitates a repurchase intention or a revisit.

Table 2. Key characteristics of VE utility and usability

Dimension	Sub-dimension	Conditions	Sources
A. Utility	1. Tools	- Visual-spatial cues and interactivity significantly enhance perceived informativeness and playfulness. The role of graphical quality was found to be more critical for 2D displays than for the 3D VR environment. - Case 3D modeling and texturing techniques were employed. Two instances of immersion are available for visualization and interaction with both virtual environments: screen,	(Kang et al., 2020) (Arrighi et al., 2021) (Carvajal et al., 2020) (Li, 2021) (Hu et al., 2020) (Altarteer & Charissis, 2019)

Dimension	Sub-dimension	Conditions	Sources
		keyboard, and mouse (Desktop VR) and Vive (VR visualization headset). - Through the establishment of an automatic recognition system for tombstone carvings, the recognition accuracy of users in the process of identifying historical pictures is improved. In addition, the efficiency of distinguishing damaged images is also improved. - Notably, 3D virtual simulation has a wide range of applications in the field of VR. Distinctive elements must be considered for different types of applications, as well HTC as different contents which need to be integrated to achieve the related interaction modes. - Utilizing the advantage of 3D VR systems regarding real-time manipulation of the product and the edibility in customizing the 3D models' features in real time has elevated positive attitudes toward the emerging technology within this specific context.	
	2. Virtual space	- Participants in the iVR group experienced stronger feelings of immersion as well as perceived 'naturalness' of interactions with the store environment compared to the desktop group. Both factors can be seen to potentially lead to enhanced perceived telepresence. - Participants accessed the website that offered apartment choices through either static photographs or interactive 360° visits. The latter was associated with better visiting experiences as well as more positive attitudes toward both the product and the agency. - 2D presentation was more effective for intuitive communication. In addition, visitor enjoyment was stimulated at different points according to various presentation methods. The 2D visitors showed their interest in information acquisition while also focusing on exhibition content, whereas 3D visitors enjoyed exploring the virtual environment.	(Schnack et al., 2019) (Pleyers & Poncin, 2020) (Petrelli, 2019) (S. Kim & Hong, 2020)
	3. Product display	- AR should be supported due to its role in enhancing perceived informativeness as well as increased enjoyment of the overall shopping experience. - Two AR characteristics—environmental embedding and simulated physical control—	(Smink et al., 2019), (Qin et al., 2021) (Farah et al., 2019) (Rauschnabel,

Dimension	Sub-dimension	Conditions	Sources
		can reduce a consumers' cognitive burden, enhance their sense of cognitive fluency, and improve their overall product attitude.	2021) (Fan et al., 2020)
B. Usability	4. Effectivity	- Informativeness and playfulness influence the purchase decision-making process in several distinct ways. A playful interface may, for example, enhance a consumers' preference for hedonic product benefits, whereas informativeness is usually a more important explanatory variable for subsequent purchase intentions. - The numbers of sales leads and won opportunities from key accounts are positively affected by the frequency of an account's employees consuming digital content. - Perceived presence, ease of use, and perceived experience value have a significant positive effect on the attitudes consumers hold toward the semi-immersive system.	(Kang et al., 2020) (Mathew & Soliman, 2021) (W. L. Wang et al., 2019) (Altarteer & Charissis, 2019)
	5. Learnability	- A consumer's enduring involvement with a product determines their ability to discriminate between product experience episodes. This causes variations in perceived similarity as well as consumption intention.	(Deng et al., 2019) (Sarmiento & Simões, 2019)
	6. Satisfaction	- Immersion mediates VE interaction effects on both satisfaction and loyalty. It plays a significant role in both experience satisfaction and loyalty intention. - By channeling a mixture of engagement and service practices into one direct touchpoint, it is possible to follow customers throughout their journey and in turn measure their satisfaction.	(Hudson et al., 2019) (Lo Presti et al., 2020)
	7. Memorability	- The intention to visit locations shown in VR tourism is influenced by attachment to VR. Cognitive response has a more profound influence than affective response on the intention to visit a destination in VR.	(M. J. Kim et al., 2020)

According to Dent et al. (2019), refinement of VR facilities lowers interest in an actual event. This review then examined the key aspects of utility and usability to understand VE's position in recent technological taxonomy from psychological and behavioral perspectives as well as from the technological perspective (Flavián et al., 2019). Thus, in the context of this review, the term utility refers to technological features utilized to support sufficient VE implementation, while the term usability refers to the UX quality derived from utilizing such features.

1. Tools

The current trend in VE development shifts focus from technological complexity to a balanced mix of technological suitability, social presence, and interactivity. Recent literature reveals six key points emphasizing that sophistication is not essential for effective tool design. Kang et al. (2020) highlight the significance of visual-spatial cues and graphical quality alongside interactivity, which enhances informativeness and user enjoyment. Interestingly, for specific products, a 2D display may be more favorable than VR. It is crucial to avoid over-visualization in product projections, leading Arrighi et al. (2021) to recommend the use of computational photography and digital imaging restoration techniques.

As Arrighi et al. (2021) demonstrated in their research on theater digitalization that VR provides a real experience. However, the study did not focus on VR integration or visually presenting the theater; rather, it emphasized detailed and realistic artifact digitalization. This approach aligns with the goals of Li (2021) and Carvajal et al. (2020) who aimed to achieve high picture accuracy and reduced errors in historical picture recognition. Carvajal et al. (2020) utilized 3D photogrammetry to visualize museum collections and make them more realistic. Successful adoption of these methods may prompt exhibitors to explore further development in a mobile format. Research suggests that when consumers perceive a Mobile Augmented Reality (MAR) app as enjoyable, useful, and informative, they tended to respond more positively (Arrighi et al., 2021).

2. Virtual Space

Unlike users who attend exhibitions via desktop, users of VR will gain new experiences with greater depth and intensity of interaction (Schnack et al., 2019). In other words, virtual space quality increases telepresence, and the reality offered by VEs not only takes the form of articles/artifacts, but also atmospheres, interactivity, and sociocultural aspects. Such things confirm Lisewski's (2006) statement that the virtual space in VEs should give precedence to proportionality over futuristic and modernity aspects. Over-manipulation will build a perception in the users' minds that VEs are nonsensical, extravagant, and loaded with fictitious fantasies.

A simple, yet effective virtual space design was modelled by Pleyers and Poncin (2020) in the field of real estate marketing. Market participants voluntarily accessed the website of a real estate agency that presented apartments through either static photographs or interactive 360° visits. This was associated with a superior 'visiting experience' as well as a more positive attitude toward both products and the agency. Thus, the use of AR and VR in VE must consider the objects to be visualized as well as the dimensions of the product pictures. In a study by Kim and Hong (2020), a 2D presentation was regarded more effective for intuitive communication than 3D. Consequently, visitor enjoyment was stimulated at different points according to various presentation methods. The 2D visitors showed their interest in information acquisition while simultaneously focusing on exhibition content, whereas 3D visitors enjoyed exploring the virtual environment. This confirms the principle that the product presentation dimension (2D or 3D) and the medium used (AR or VR) depends on the features of the virtual space to be developed.

Yu (2011) mentioned four VE design alternatives based on the VR level applied, namely, desktop VR, immersive VR, VR with AR, and distributed VR. The four types do not represent the effectiveness level, but only discriminate the feature completeness and the meaningfulness of the user experience. The effectiveness is therefore influenced by the VE objectives and the types of objects exhibited (Zidianakis et al., 2021). This review recommends the third and fourth types as they are balanced in terms of user experience, technological sophistication, objects exhibited, and VE objectives. The third type focuses on product visualization, while the fourth focuses on improving social presence.

3. Product display

If an object is 3D-modelled in a virtual environment, it will generate immersive AR. Usually it is aimed at increasing object co-visibility (Lu & Peponis, 2014). This review recommended using mixed

reality, i.e., combining AR and VR (Speicher et al., 2019). Therefore, AR should be incorporated due to its role in enhancing the perception of both informativeness and resulting enjoyment (Smink et al., 2019). Perceived informativeness can lead to a cognitive process that enhances both purchase intention and a willingness to share personal data with the brand, while perceived enjoyment leads to an affective process that enhances a positive attitude towards the brand (Qin et al., 2021). Two AR characteristics—environmental embedding and simulated physical control—can reduce a consumers’ cognitive burden, as well as enhance their cognitive fluency, and improve their attitude towards a product (Fan et al., 2020). This means that AR not only reduces the effort users require to tour, but also summarizes most of the information on the visualized objects (in 3D form) and transcribes verbal information as visual information.

According to Mayer’s cognitive theory (2009), every individual has a unique information processing channel for audio and visual information, and every information processing channel is limited to only one point in time. Thus, the larger part of information increases the individual’s cognitive load. This load can only be reduced if the information is well-designed according to the individual’s cognitive processing habit, and, if unnecessary, cognitive processing is cut down (Clark & Mayer, 2016). Product display, in this case, is highly responsible for increasing or decreasing cognitive load.

4. Effectivity

The above review claims that users’ decision-making processes are influenced by a number of factors such as informativeness, playfulness, and usefulness. Research by Bonetti et al. (2018) has proven this. According to the research, AR and VR use does not negate informativeness. Instead, VR and AR allow for the efficient delivery of product details, which in turn speeds up the consumer purchase decision-making process. Nonetheless, perceived enjoyment and convenience are antecedents of customers’ attitudes, which, in turn, influence their both intention and behavior to buy or select a given product (Mathew & Soliman, 2021). More detailed research by Murwonugroho and Tyasrinestu (2019) explains how playing with visual cues in product presentation can leave an impression on users. They were of the view that the interplay of visual cues is highly contributive to both playfulness and enjoyment. Meanwhile, success in the informativeness aspect is largely contributed by the sometimes-hyperrealist presentation of VR and AR. In other words, product presentation in VEs not only shows ‘what’, but also tells ‘how’ the product is made, from what materials, and how it is maintained (Gifreu - Castells, 2019).

5. Learnability

According to Sarmiento and Simões (2019), trade fairs play an important role in companies’ interactions with existing and potential customers, fostering business relationships and enhancing customer engagement via physical and virtual platforms. While physical trade fairs are important for personal interaction, virtual trade fairs are highlighted for fostering interactivity and connectivity pre- and post-physical events (Sarmiento & Simões, 2019). People’s sustained engagement with a product influences their ability to distinguish between different product experiences, impacting perceived similarity and consumption intent (Deng et al., 2019). Lu’s (2013) observation that the digital realm offers diverse opportunities for learning remains relevant, especially concerning the art exhibition domain. VEs are a novel medium that broadens the scope of artwork forms and concepts. Therefore, for a VE to be effective, it must offer comprehensive product information, ensure minimal errors in VE functionality understanding, and leave a positive impression on users.

6. Satisfaction

Research conducted by Hudson et al. (2019) revealed three categories of immersion. These variables play a significant role in both the experience of satisfaction as well as loyalty intentions. Specifically, immersion mediates person-VE interaction on both satisfaction and loyalty. Today, the

three categories are typically used to conduct business by means of mobile conversational commerce. This is acknowledged as a unique touchpoint for customers who wish to experience the product and or service. By channeling a mix between engagement and service practices into one direct touchpoint, it is possible to follow customers throughout their journey and detect their corresponding levels of satisfaction (Lo Presti et al., 2020).

Nevertheless, it is also important to realize that satisfaction is a matter of subjective perception. According to this review, satisfaction can only be obtained if (a) the user's satisfaction is met, (b) the user obtains benefits, and (c) the user feels safe (from risks). To this end, McTavish (2008) even argued that satisfaction can be triggered by the first impression the user perceives in the very first encounter when he or she sees the 'home page'. McTavish (2008) described that user satisfaction is also influenced by whether or not user expectation during a VE visit is fulfilled.

Therefore, this review recommends that VEs should at least be able to increase user trust by meeting the above-mentioned requirements. For example, if users no longer see the strength of an artwork in the aesthetic aspect, as Murwonugroho (2019) demonstrated, a VE must accommodate this by highlighting the practical utility or functionality aspects. The result aligns with Marza et al.'s (2019) finding that user trust in purchasing a product is based on user trust in the exhibitor.

7. Memorability

Authentic experiences provide a benchmark for determining whether a VE can generate real experiences or not. The more an exhibition mimics reality, the more intense the user's cognitive and affective activities are. However, both cognitive and affective responses are significant mediators in predicting attachment and visit intention. Cognitive responses have a stronger influence than affective responses, particularly on the intention to visit a destination in VR (Kim et al., 2020). consequently, if a VE takes VR use in product promotion seriously, it should be able to create a certain value through the virtual space (Geigenmüller, 2010). It is this created value that will eventually leave lasting positive impressions in the user's mind to repurchase or revisit the VE on another occasion. According to Kalbuadi et al. (2018), the efforts to improve in the memorability sub-dimension are summarized in user experience and user interface studies.

3.2. User-exhibitor humanistic interaction

Every VE must incorporate VR, and every VR must be feasible in terms of three basic characteristics of VR technology: immersion, imagination, and interaction (Yu, 2011). VR is said to be feasible in the immersion aspect if the user is 'immersed' in the virtual environment. What he or she sees, hears, and touches is then regarded as the same as what he or she does in the real world. VR is said to be feasible in the imagination aspect if it facilitates both the user's perceptual and rational knowledge acquisition. Finally, VR is said to be feasible in the interactivity aspect if it has the capacity to support human-computer harmony with the various objects to be virtualized.

Table 3. Key characteristics of interactiveness

Dimension	Sub-dimension	Conditions	Sources
A. Assistance	Virtual agents/virtual assistance	- Agent features induces a heightened sense of spatial and social presence. - Event-driven simulation assists in estimating human-robot cycle times, developing process-plan, layout optimization, and robot control. It is used in VR to interact with production equipment and particularly with the robot.	(Arrighi et al., 2021) (Schmidt et al., 2019) (Malik et al., 2020)

Dimension	Sub-dimension	Conditions	Sources
	Conversational	- By channeling a blend between engagement and service practices into one direct touchpoint, it is possible to follow the customer throughout their journey and measure their level of satisfaction. Nevertheless, new skills are required, for example, two-way communication skills, suitability, and social CRM skills.	(Farah et al., 2019)
B. Social presence		- A sense of social presence can be built by interacting with certain objects in VR. - Customers desire interaction with a 'human' instead of a robot, and they do not find touring exhibited products on their own as desirable rather, social networks and virtual communities together play an important role in visitor walk-ins, for example, in museums.	(Pengnate et al., 2020) (de Regt et al., 2021) (Fernandez-Lores et al., 2022)
C. Psycho-linguistic factor		- Visitors consider that sound is essential for the high level of realism they experience in the hybrid virtual environment, in the sense of 'actually being there', and that this is dependent on signal types that are appropriate in form and variation. Additionally, questions of quality and delivery methods have a minimal impact on the visitor experience. - Both embodied and thematically related audio-visual representations of VAs positively influence the overall user experience.	(Rudi, 2021) (Schmidt et al., 2019)

Basically, a VE user must be able to interact with multidimensional information through multiple senses. For instance, when handling a basketball in the virtual space, the user should be able to feel the weight of the ball and let it bounce on the floor. However, as Ullrich and Zara (2002) assert, the discussion about the interactivity aspect not only encompasses user-product interactivity, but also user-user interactivity, or at least user-exhibitor interactivity. Therefore, it is important for a VE to meet all social presence conditions. In relation to the interactivity aspect, this review suggests that there are four prerequisites that must be fulfilled (see Table 3).

8. Virtual assistance

This review emphasizes that an effective Virtual Exhibition (VE) should incorporate a virtual assistance feature, ensuring users are not left to explore the VE alone. This humanoid holographic assistant acts as a guide, offering information and engaging users with interactive and so engaging product presentation. To enhance user experience, the assistant should mimic human behavior, facial expressions, language, and intonation as closely as possible. Wang & Xia (2019) stress the importance of the communication relationship between users and exhibitors in VEs, advocating for a human-like

approach. They argue that many VEs prioritize product presentation over user satisfaction and other humane aspects such as the need for guidance and feedback.

The use of Virtual Humans (VHs) in culture-related VR applications is increasing, ranging from simple 2D characters to advanced 3D avatars, showcasing the continual evolution of technology and the growing significance of virtual assistants (Machidon et al., 2018). In the development of human-like virtual assistants, Arrighi et al. (2021) suggest employing game engine visual programming to manage animated human characters effectively. Therefore, integrating virtual assistance enhances not only the spatial and social presence within VEs but also user engagement (Schmidt et al., 2019).

9. Conversational

VR is commonly viewed as a tool that enriches consumer experiences rather than solely driving sales conversions (Farah et al., 2019). By integrating engagement and service practices into a singular touchpoint, companies can track customer journeys and gauge satisfaction levels. However, mastering new skills is crucial, including two-way communication proficiency, adaptability, and social CRM expertise (Presti et al., 2020). Communication within a Virtual Exhibition (VE), as highlighted by Samson et al. (2014), holds marketing effectiveness. Nonetheless, despite its efficacy, Samson et al. (2014) contends that VE communication falls short compared to regularly scheduled television advertisements and word-of-mouth promotion.

Effective communication in VEs is not solely due to digitalization but thrives on enabling oral exchanges between users and exhibitors through audio-visual aids, often facilitated by virtual assistants. Both Farah et al. (2019) and Lo Presti et al. (2020) highlight the significance of interactive communication between users and exhibitors. To support this, VE organizers should consider the four factors proposed by Kim (2018): personal, social, content, and environmental factors. Personal elements account for visitors' traits influencing decision-making, navigation, and interaction levels, ultimately shaping communication within the virtual exhibition. Social aspects, often mirrored in social media engagements, encompass interactions with digital agents, museum professionals, and fellow users. Content factors evaluate information quality and exhibition content presentation methods, whereas environmental factors analyze the physical settings affecting exhibition content, such as information architecture, system quality, and usability.

10. Social presence

Customers want to interact with a 'human' (rather than a robot), and they do not find touring an exhibition alone as desirable (de Regt et al., 2021). Thus, it is critical to pay attention to virtual assistance development and then realize it. Moreover, social networks and virtual communities together play a significant role in visitor attendance numbers. Visitors not only desire to communicate with the exhibitor, but they also want to communicate with other visitors (Fernandez-Lores et al., 2022). In other words, the social presence sub-dimension is inextricably related to the satisfaction and virtual assistance sub-dimensions. This is because the target to be attained in this sub-dimension is a participant's perceived 'sense of being there' characterised by the resulting enjoyment while being exposed to a virtual exhibition in relation to the experience of a real-world visit (Sylaiou et al., 2010).

11. Psycho-linguistic factor

Visitors consider that sound is essential to create the high degree of realism they experience in the hybrid virtual environment, also in the sense of 'being there'. This is dependent on signal types that are appropriate in sort and variation. Additionally, relevant to exhibition design practice, issues of quality and delivery method have a minimal impact on the visitor experience (Rudi, 2021). The psycho-linguistic factor depicts the supporting determinants of VE success based on the user-exhibitor (virtual assistance) communication language. Language may be either verbal or pictorial. For example, in face-to-face exhibitions, there is a greeting from a 'front-liner' with a happy face expressing comforting words. This should be available in VEs. At any rate, language provides a measure for users to justify

whether they have been welcomed and treated well or not (Peeters, 2019). Ultimately, such a justification contributes to satisfaction, effectiveness, and memorability.

This review argues that VEs should ideally provide an audiovisual greeting through virtual assistance to a new user, for instance, by saying “Hi, David. Welcome to the Kalimantan local product exhibition”. In another booth, the virtual assistant may provide a spoken explanation of a product through its holographic display, for instance, by saying “We use selected materials to provide you with this durable, trendy, multifunctional traditional bag”. On one occasion, or another, the virtual assistant may ask a question, “Sir, which one of these suits your needs most?” to increase the two-way communication intensity. These are considered important to overcoming various VE interactivity problems which, according to Zou et al. (2021), are frequently overlooked, in other words, leading a user to a purchase transaction requires an intimacy developed using appropriately engaging language.

4. Conclusions

This SLR advances our understanding of the key factors influencing the feasibility of VEs for product promotion. The 11 identified sub-standards across utility, usability, and interactivity dimensions provide a comprehensive framework for designing effective VEs that balance technological sophistication with user-centric considerations. In particular, the findings underscore the crucial role of virtual assistance, social presence, and psycho-linguistic factors in creating a more engaging and humanistic VE experience. However, the review also reveals some limitations and gaps in the current literature, such as a lack of longitudinal studies examining the long-term impacts and sustainability of VEs, as well as limited consideration of emerging technologies like AI and their potential to transform VE design and user interaction. Future research should address these gaps and provide more empirical evidence on the economic and marketing performance of VEs compared to traditional exhibitions. Practically, VE designers and managers should prioritize the identified sub-standards in their planning and evaluation of VEs, while also considering the unique needs and preferences of their target audiences. Overall, this review lays a foundation for further advancing the theory and practice of VEs in the rapidly evolving digital landscape.

Finally, although beyond the scope of this paper, it is recommended that a further enquiry evaluate the impact of AI on both VEs and VAs. This study would be undertaken with special reference to AI's contemporary cultural appropriateness for the Indonesian social context as measured against effectivity, learnability, satisfaction, and memorability.

Limitations and Further Research

The limitation of this research method lies in the restricted analysis of the referenced articles as research objects. However, this provides an opportunity to update the latest knowledge for researchers, where there is still a need for compiling findings that can integrate or disregard existing results. The Systematic Literature Review (SLR) method serves as a crucial foundation for sustainability and innovation in research.

A virtual exhibition is a virtual space where transactions take place. Typically, creators tend to cultivate a positive image, yet there is limited development of unique or challenging content. During transactions, various pragmatic events occur such as bargaining processes, interactions involving banter, sellers waiting for the right time to sell, or the existence of chat rooms between buyers and sellers. This can involve buyers in bulk purchasing or sharing information about discounted products. Further research is focused on integrating unique social behaviors of sellers or unexpected behaviors of buyers. The presence of humor can strengthen intimate relationships between buyers and sellers. Developing indicators to understand resistance and fantasy in virtual exhibitions poses challenges for further research. Additionally, integrating virtual exhibitions with artificial intelligence is of interest, where applications can manage selling prices or assist buyers in negotiation processes within virtual exhibitions.

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