

# Implementation of the Application for Organizing 3d Digital- Based Virtual Exhibitions in the MICE Industry of Medan City

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## Abstract

*The aim of this research is to develop a 3D Digital-based exhibition organizer industry so that it can have a global market by increasing the competitiveness of the exhibition event business market. This research was conducted with 50 event organizers as sample as well as population who are members of the Association of Indonesian Exhibition Companies (ASPERAPI). The implementation of this virtual exhibition application is carried out by providing tutorials and creating exhibition projects. The analysis using experimental method with descriptive statistical tests of rating results. The research results produced 6 virtual exhibition event projects designed by samples grouped into 6 groups. Then the results of the virtual exhibition event project are assessed by the instructor and rated. For quantitative testing, the results of questionnaires from participants (sample) were analyzed and resulted in the conclusion that the use of applications for organizing virtual exhibition events has advantages such as being easy to use, can be used for any type of exhibition and is small or large in scope. Meanwhile, the weakness is that participants and visitors in organizing this virtual exhibition event must have digital technology knowledge and skills.*

**Keywords:** *virtual exhibition event, digital 3D, MICE industry.*

## Introduction

The MICE industry, which is currently growing and is the mainstay of improving the country's economy, must also be able to keep up with the development of digital technology. The MICE industry today can not only be carried out offline or onsite, but also carried out online. After the Covid-19 Pandemic, the MICE industry can still be run online using digital technology and for this reason, the MICE industry must have human resources who adapt to digital technology capabilities (Herceg et.al.; 2020). The MICE event industry is increasing because indeed the MICE industry can increase a country's income more than the income from the conventional tourism sector (Ministry of Tourism and Kraf, 2020).

The exhibition event business increases national revenue from the sale of products and services during the exhibition and this is a trigger for an increase in the business or business of organizing MICE events, especially exhibition events. The exhibition is one of the effective promotional activities by presenting products from the industrial and artistic fields from producers (business entities and individuals) to be conveyed to other people who need to be responded to, appreciated and utilized by their users, responded to, appreciated, and used by the wider community, both end users and users for their industry and business continuity (Karsono, 2016). The Association of Indonesian Exhibition Companies (ASPERAPI) North Sumatra is an organization that oversees various exhibition organizing companies in North Sumatra that conduct MICE business in the field of Exhibitions. In the MICE business experiences, especially the organization of exhibitions, ASPERAPI also have competition experiences with increasingly fast/high competition and technology conditions.

The exhibition application produced by the researcher is a learning application for organizing exhibitions using 3D animation technology and this application will be tested for use by entrepreneurs organizing exhibitions (ASPERAPI). The implementation of the exhibition organizing application will be carried out on different types of exhibition organizer as entrepreneurs. The difference in the use of this exhibition application requires its own techniques, skills and knowledge. In addition, the advantages and disadvantages

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of the exhibition organizer application will result in an effect on the quality of virtual exhibitions carried out by entrepreneurs.

This research outlines what arises as problems in the exhibition event organizing industry that can threaten the sustainability of their business due to very rapid technological developments and also global competition. Therefore, the formulation of the problems of this research is: 1. Whether the Exhibition Event Organizers in ASPERAPI use the virtual exhibition event management application to develop the implementation of exhibition events; 2. How is the application of the application for organizing virtual exhibition events with 3D animation according to the type of exhibition being conducted? 3. What are the disadvantages and advantages of the application for organizing virtual exhibitions using 3D animation from other applications?

## Literature Review

Virtual exhibitions, as an alternative to physical exhibitions, offer a variety of advantages such as a wider range of attendees, flexibility of time and place, and reduced travel and accommodation costs (Ulva, 2022). Previous studies have explored various aspects of organizing virtual exhibitions. For example (RWIGEMA (Ph.D), 2020) examined the impact of COVID-19 on the MICE industry and emphasized the importance of adopting digital technology in organizing events. Meanwhile, (Ulva, 2022) developed a learning application for the implementation of virtual exhibitions using 3D animation, which shows the potential of immersive technology in improving the experience of participants.

Overall, virtual exhibitions are similar to real exhibitions or conventional exhibitions in general, the difference lies in the form of the products or services exhibited are virtual. As explained by Ciurea et al. (2014), the virtual exhibition is an effort to display real objects in the form of 3D visualization of the environment where the exhibition object is located. Virtual exhibitions (VE) open up new opportunities for exhibition management businesses as well as for education because there is additional content outside of the exhibition itself, so that VE can offer an experience and interactivity for visitors and participants if it is well designed.

Researcher Herman Setyawan (2020) proves or shows that the virtual exhibition mainly aims to educate and increase public awareness about archives, as well as promote the archive institution itself. Supplement et al. (2016) explained the uses (benefits) and advantages of exhibitions by means of virtual galleries, namely (1) the implementation of art product promotion is easier and more efficient, (2) the achievement of a wider market of visitors and participants compared to conventional exhibitions, (3) students/art actors are easier to get job offers, and (4) virtual media is more interactive and interesting to see.

How to increase participants and visitors to virtual exhibitions consists of: (V-Cube Indonesia, 2023): 1) Create a Landing Page: The landing page is an important part of a virtual exhibition. Because this landing page is the first promotional event that visitors see. The landing page can help visitors about an interesting description of the event through the display of the teaser video;

Use 3D technology: The Virtual Exhibition platform provides Live 3D and 360o features so that exhibition visitors can directly walk around the virtual exhibition area using a 3D avatar like playing a game and also provide a more interactive experience for visitors; 3) Prepare Virtual Lobby: Provide an attractive virtual lobby to welcome visitors when they first enter the virtual platform. 4) Arrange Booth placement: Sometimes one exhibitor has several booths because it needs a larger place to promote products. Booths must be able to display information about company profiles, products and contact information. Visitors can ask questions directly to the booth keeper interactively; 5) Provide Clear Information: Visitors should be able to easily understand what your brand has to offer and the benefits that can be gained by using your products or services. Use interactive content such as videos, images, or live impressions to grab visitors' attention and build their engagement with your brand; 6) Attractive Virtual Hall Design : The main area of the virtual exhibition is inside the Virtual Hall. Place navigation buttons that are easy to see and use. Create specific spots so that your visitors quickly know how they should explore the hall and visit the booths provided; 7) Gamification: Providing an element of gamification is essential to increase the enthusiasm of

virtual exhibition visitors. Gamification that can be done includes giving points to visitors every time they do activities on the platform. Starting from login, entering the lobby, entering the hall, visiting the booth and interacting with the elements provided in the booth. 8) Provide Live Chat feature: can help guide visitors through virtual exhibitions and provide necessary information quickly and easily, making the interaction between fellow visitors and visitors with exhibitors more lively. 8) Use Social Media: Use social media platforms such as Instagram, Twitter, Facebook or Youtube to promote your virtual exhibition and reach a wider audience. 9) Use Analytics: Using analytics can help exhibition managers to collect and analyze data about exhibition visitors and their behavior within the exhibition.

## Method

This type of research is action research and research and development. This research model is in the form of an experiment, namely the implementation of an exhibition application to 50 exhibition organizers as respondents/research objects who make a simulation of exhibition management with digital techniques in the form of 3D games. The trainer/developer of this virtual exhibition application is a programmer who makes a web-based virtual exhibition application with the concept of organizing exhibitions from exhibition implementation courses. Participants were divided into 6 groups consisting of 6-8 participants (respondents). Each group is required to use a laptop that uses specifications that can be used for animated videos with sufficient memory.

Measurement and observation in the study used parameters, namely the variables of Concept, Stages and Program Preparation with each consisting of 3 indicators as follows: 1) 1. Virtual exhibition event project concept: a. Suitability of the concept with the needs and trends of the MICE industry in Medan City; b. The uniqueness and attractiveness of the 3D digital-based virtual exhibition concept; c. Completeness and clarity of the preparation of the concept of the virtual exhibition event project; 2) Stages of preparing the virtual exhibition implementation program using 3D Animation: a. Planning and design of the virtual exhibition layout based on 3D digital;

Development of virtual exhibition content and materials (text, images, videos, animations); c. Integration of interactive and engagement features in virtual exhibitions; d. Testing and evaluation of the 3D digital-based virtual exhibition implementation program; 3) Preparation of the program as the stage of organizing the exhibition in simulation and exhibition games: a. Implementation of the concept and stages of program preparation in the simulation of virtual exhibitions; b. Development of games or interactive activities in virtual exhibitions to increase participant engagement; c. Trial and evaluation of simulation and virtual exhibition games based on 3D digital.

The data collection techniques carried out are: 1) Survey techniques using questionnaire techniques given to exhibitors and visitors as a response or perception of the application trial of 3D digital-based exhibition implementation, as well as application validation sheets provided by application developers or programmers (in this case virtual exhibition project vendors) and MICE industry practitioners. The results of the application validation sheet, the responses of exhibitors, and visitors are used to determine the feasibility and effectiveness of the application that has been developed. To analyze the respondents' answers (as validators) and the responses of the event exhibition organizer participants, the researcher used descriptive statistics of the rating results described below:

**Table 1. Measurement of Test Use of Virtual Exhibition Organizing Applications**

Application Validation	Exhibition Organizer Response	Interpretation	Value Weights
Very good	Strongly agree	76-100%	4
Good	Agree	51-75%	3
Not good	Disagree	26-50%	2
Not good	Disagree	0-25%	1

Source: Researcher, 2024

Observation: The researcher made observations on the use of virtual exhibition applications that will be used by 50 business people organizing exhibitions who are members of ASPERAPI; 3) Literature

Data Analysis Techniques: The researcher will look for the maximum number of (highest) values in the Concept, Stages and Program Preparation aspects, namely: a. Determining the number of respondents  $x$  the weight of the maximum value (highest) in the quantitative assessment  $x$  the number of assessment criteria. The assessment formula is: Maximum Number of Values (Highest) Concept Aspects =  $n \times i_{\max}$ , where  $n$  = number of respondents,  $i_{\max}$  = maximum score weight of qualitative assessment; b. Determine the number of respondents' answers. The determination is to multiply the number of respondents in each qualitative assessment by the weight of the score, then add up all the results. The formula used can be seen in the following equation: Number of Stages aspect values =  $\sum_{i=0}^4 (n_i \times i)$ , Description:  $n_i$  = number of respondents who chose Value  $I$  = *weight of quantitative* assessment scores (0-4); c. Determine the number of respondents' answers. The determination is to multiply the number of respondents in each qualitative assessment by the weight of the score, then add up all the results. The formula used can be seen in the following equation: The number of values for the Program Preparation aspect =

$\sum_{i=0}^4 (n_i \times i)$ , Description:  $n_i$  = the number of respondents who voted, Value  $I$  = the weight of the quantitative assessment score (0-4), ranking results (HP), after summing the answers to the value of the application usage aspect, The next step is to determine the results with the formula can be seen at:

$$HP = \frac{\sum_{i=0}^4 (n_i \times i)}{n \times i_{\max}}$$

## Result and Discussion

The implementation of the use of this virtual exhibition application until the completion stage is that the virtual exhibition event project lasts for 2 hours. First of all, participants are guided to create an account so that they can use the application for organizing exhibition events on their respective laptops. Then participants are instructed to log in to the virtual exhibition application website using the email and password created. For the next stage, participants are guided to make features according to the needs of each group and continue the next stages until it is in the form of a virtual exhibition event project with a different exhibition concept. The following are the results of the implementation made by the participants:

### Group 1

Group 1 has successfully designed and implemented a gaming exhibition booth that focuses on products related to the game Mobile Legends: Bang Bang.



**Figure 1. KeVirtual Exhibition Event Project Group 1**

Source: Data Processing Results

The main components of the booth include: 1) Self-configurable hall layout design; 2) Strategic placement of company logo; 3) Display of gaming products offered; 4) Promotional materials in the form of brochures and posters. The implementation of the booth is carried out through the application system provided, where group members can: a. Upload photos of the product; b. Include a link to the online store

### Group 2

**Figure 2. Event Project Group 2**

Source: Data Processing Results

Group 2 has successfully designed and implemented a Helmet exhibition booth that focuses on helmet sales products, but Group 2 has not been able to fully implement what the developers said that they only include with the same photo. The development process of this booth was carried out with guidance from the development team and completed within 2 hours.

### Group 3





**Figure 3. Event Project Group 3 Source: Data Processing Results**

Group 3 has successfully designed and implemented an exhibition booth for motorcycle brands. The development process of this booth was carried out with the direction of the development team and was completed within 2 hours. The main components of the booth include:

Layout design that displays the flagship motor in a strategic position; b. Prominent placement of brand logos throughout the booth area; c. Display the latest motorcycles, complete with technical specifications and superior features; d. Promotional materials in the form of brochures, motorcycle catalogs, and promotional videos. The implementation of the booth was carried out through an exhibition application, where team members could: 1) Upload photos and videos of the latest motorcycles; 2) Include links to online catalogs, including price simulations and motorcycle credits.

#### *Group 4*

**Figure 4. Event Project Group 4 Source: Data Processing Results**

Group 4 has successfully designed and implemented an exhibition booth for a home paint shop. The development process of this booth was carried out with guidance from the development team and completed within 2 hours. The main components of the booth include: 1) Self-configurable hall layout design; 2) Strategic placement of paint brand logo; 3) Display of different types and colors of paint offered; 4) Promotional materials in the form of color catalog brochures and posters of interior design inspiration. The implementation of the booth is carried out through the application system provided, where group members can: a) Upload photos of paint color samples;

Include links to online catalogs and virtual color simulators; c) The overall development process of this booth reflects effective collaboration between group members, as well as their ability to apply the guidance provided by the development team to create an attractive and informative

display for potential home paint buyers. Creative in making a home paint shop selling various brands in the booth.

*Group 5***Figure 5. Event Project Group 5**

Source: Data Processing Results

Group 5 successfully designed an exhibition booth for motor vehicle oil products, where the entire development process was carried out under the direction of the development team and completed within 2 hours. The main components of the booth include: 1) A design that visually highlights the benefits of oil products; 2) Brand logos are strategically placed for easy visibility;

Oil type display for different types of vehicles, complete with technical information; 4) Promotional materials in the form of product catalogs, demonstration videos of oil benefits, and educational posters. This booth is implemented through a digital exhibition platform that allows team members to: a. Upload photos of oil products and explainer videos; b. Include links to online catalogues that provide oil selection guides. This booth displays complete solutions for all types of motor vehicle oil brands.

*Group 6***Figure 6. Event Project Group 6**

Source: Data Processing Results

Group 6 successfully designed and implemented an exhibition booth for men's watch products. This process was carried out with the guidance of the development team and was completed in 2 hours.

The main components of the booth include: 1) Elegant booth design that reflects luxury and modern style; 2) Elegant and easy-to-see placement of brand logo; 3) Display the watch collection, displaying a variety of advanced designs and features; 4) Promotional materials in the form of product catalogs, style inspiration

posters, and promotional videos. Through the exhibition application, group members can: a. Uploading photos of men's watches in various displays; b. Include a link to the online catalog, complete with purchase options and feature details. The booth is designed to create a luxurious and alluring atmosphere, attracting the attention of consumers looking for classy men's watches. In the implementation of this application, group 4 is the best in designing an exhibiton booth in this application, where group 4 sells products clearly by including the name of the store and paint brand products that will be marketed to exhibition visitors in this application.

### *Survey Research Results*

The results of the research using a survey technique using a questionnaire consisting of 15 questions containing indicators of the use of applications for organizing virtual exhibition events that have been carried out directly by the participants. Participants are instructed to create an exhibition project for 2 hours after completing the training or tutorial on using the virtual exhibition application. The statement was responded to by participants with ratings of disagree, disagree, agree and strongly agree. The scores obtained from 50 respondents were ranked with the formula:  $\text{Value} = (\text{TS} \times 1) + (\text{KS} \times 2) + (\text{S} \times 3) + (\text{SS} \times 4)$  so that the ranking of 15 indicators made in accordance with the criteria for the application of virtual exhibitions compared to offline exhibitions (onsite) can be determined. The results of the indicator ranking can be seen in the table below:

Indicators	Var	TS	KS	S	SS	Sum	Value
The use of this application can save costs in organizing exhibitions.	Apl1	1	4	26	19	50	163
The use of this exhibition application can save time to organize exhibitions	Apl2	1	5	24	20	50	163
The use of the application that I have learned is flexible according to market conditions.	Apl3		8	26	16	50	158
The use of this application can be close to the needs of the actual exhibition	Apl4	1	3	23	23	50	168
This application can be used easily by event organizers	Apl5	1	4	32	13	50	157
The use of this application is fun for event organizers in the field of exhibition management.	APL6	1	5	34	10	50	153
The use of the application can accommodate the creativity of event organizers in organizing exhibitions.	Apl7	1	0	24	25	50	173
The use of the application is easy to document	APL8	1	1	20	28	50	175
The use of this application facilitates localization in the context of the interests of digital exhibition visitors	Apl9	1	4	22	23	50	167
The use of the application is relevant for the business purpose of organizing exhibitions professionally	APL10	1	6	24	19	50	161

**Table 2. Results of the Assessment Questionnaire for the Use of Virtual Exhibition Applications**

(Source: Research Results, 2024)

From the table above, the Application Usage indicator is easy to document and gets a value of 175. The indicator of the use of this virtual exhibition application that can describe the exhibition products in detail



also gets a score of 175. Meanwhile, the indicator of the application of the virtual exhibition organization application can be modified to a greater extent and the use of the application can accommodate the creativity of the event organizer in organizing the exhibition getting a score of 174 and a score of 173.

## Discussion

The results of the research on the use of virtual exhibition applications carried out by experiment and observation, the determination of the project level of virtual exhibition is made based on the criteria that are the variables for measuring the results of experiments (training) as follows: 1. Virtual exhibition event project concept: a. Suitability of the concept with the needs and trends of the MICE industry in Medan City; b. The uniqueness and attractiveness of the 3D digital-based virtual exhibition project concept; c. Completeness and clarity of the preparation of the concept of the virtual exhibition event project; 2. Stages of preparing a virtual exhibition program using 3D Animation: a. Planning and design of 3D digital-based virtual exhibition layouts; b. Development of virtual exhibition content and materials (text, images, videos, animations); c. Integration of interactive and engagement features in virtual exhibitions; d. Testing and evaluation of the 3D digital-based virtual exhibition implementation program; 3. Program preparation as a stage of organizing exhibitions in simulations and exhibition games: a. Implementation of concepts and stages of program preparation in virtual exhibition simulations; b. Development of games or interactive activities in virtual exhibitions to increase participant engagement; c. Trial and evaluation of simulation and virtual exhibition games based on 3D digital. Of all participants who participated in the training on the use of the virtual exhibition application, they were divided into 6 groups. Then each group was asked to make an exhibition event project for 2 hours with their own ideas. The results of the virtual exhibition event project carried out by the group were assessed and ranked with an explanation of the assessment criteria from the resource persons or tentators who supervised their work as well.

Based on the assessment set, namely the variable consists of 3 variables with 3 indicators each, then group 1 and group 3 get the highest assessment. The highest assessment means that the use of virtual exhibition applications can be understood and used for exhibition organizers to develop their exhibition event business.

**Figure 7. Best Assessment Event Project**



Source: Data Processing Results

Group 1 has successfully designed and implemented a gaming exhibition booth that focuses on products related to the game Mobile Legends: Bang Bang. The development process of this booth was carried out with guidance from the development team and completed within 2 hours. The main components of the booth include: 1. Self-configurable hall layout design; 2. Strategic placement of the company logo; 3. Display of gaming products offered; 4. Promotional materials in the form of brochures and posters. The implementation of the booth is carried out through the application system provided, where group members can: a. Upload photos of the product; b. Include a link to the online store. The overall development process

of this booth reflects effective collaboration between group members, as well as their ability to apply the guidance provided by the development team.



**Figure 12: Best Assessment Event Project**

Source: Data Processing Results

Group 3 has successfully designed and implemented an exhibition booth for motorcycle brands. The development process of this booth was carried out with the direction of the development team and was completed within 2 hours. The main components of the booth include:

Layout design featuring the flagship motor in a strategic position; 2) Prominent placement of brand logos throughout the booth area; 3) Display the latest motorcycles, complete with technical

specifications and superior features; 4) Promotional materials in the form of brochures, motorcycle catalogs, and promotional videos

The implementation of the booth is carried out through the exhibition application, where team members can: a. Upload photos and videos of the latest motorcycles; b. Includes links to online catalogs, including price simulations and motorcycle loans. The team's collaboration resulted in an attractive and informative booth, attracting the attention of potential motorcycle buyers and highlighting innovation and product quality.

The use of this virtual exhibition application is carried out by participants to create a virtual exhibition project, namely a virtual gaming exhibition. Participants use the concept of virtual exhibition event projects in accordance with the needs and trends of the MICE industry in the city of Medan, then the exhibition event project has the uniqueness and attractiveness of 3D digital-based and is accompanied by completeness and clarity in the preparation of the virtual exhibition event project concept.

Participants who use the application for organizing this virtual exhibition event also carry out the stages of preparing the implementation program by using 3D Animation, planning and designing 3D digital-based exhibition layouts and also developing virtual exhibition content and materials. Creating exhibition event projects with this application is also with the integration of interactive features and engagement in virtual exhibitions. Testing and evaluation are also carried out based on 3D digital. Furthermore, the creation of virtual exhibition event projects is also carried out by preparing programs as the stage of organizing exhibitions in simulations and exhibitions, namely implementing the concept and stages of program preparation in virtual exhibition simulations, game development or interactive activities in virtual exhibitions to increase participant engagement and trials as well as evaluation of simulations and virtual exhibition games based on 3D digital.

Based on the results of quantitative research conducted to strengthen this research, a positive response was obtained from the respondents in using the application for organizing virtual exhibitions based on 3D Animation. From the results of the questionnaire filled out by the respondents as many as 15 statements, all questions said that the use of this virtual exhibition application can describe the product/service in detail so that visitors and buyers can see the entire product/service on display. The use of this virtual exhibition application is also easy to document or store properly so that it becomes evidence of the event owned by the event organizer as an evaluation for the next exhibition event.

The application of this 3D digital technology-based virtual exhibition can also be modified to a greater extent in scope such as the international level and the number of participants and visitors. In addition, the use of this virtual exhibition application can accommodate the creativity of event organizers in organizing exhibitions and can also meet the needs of holding actual exhibitions. The use of this virtual exhibition application can also penetrate the international market of the exhibition business but can facilitate localization in the context of the interests of digital exhibition visitors and can approach the needs of holding actual exhibitions or offline exhibitions. The application of this virtual exhibition application for the implementation of exhibitions can save time and likewise save costs to hold the actual exhibition, but the implementation of exhibitions can penetrate the international market of the exhibition business so as to motivate event organizers to improve the business of organizing exhibition events.

## Conclusion

- Exhibition Event Organizers (EO) can use the virtual exhibition event organization application to develop the organization of exhibition events.
- The application of the application for organizing virtual exhibition events with 3D animation is in accordance with the type of exhibition carried out by EO exhibitions in Medan City such as service and product exhibitions.
- The use of virtual exhibition event applications has advantages such as being easy to use, can be used for any type of exhibition and small or large scope. Meanwhile, the weakness is that participants and visitors in organizing this virtual exhibition event must have knowledge and skills in digital technology.

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