

Exploring the Immersion and Telepresence in Gamified Virtual Tourism Experience toward Tourist's Behavior

Aniesa Samira Bafadhal*

Tourism Program, Faculty of Administrative Science
Brawijaya University
Malang, Indonesia
*aniesa.bafadhal@ub.ac.id

Muhammad Rosyihan Hendrawan

Library and Information Program, Faculty of Administrative
Science
Brawijaya University
Malang, Indonesia
mrhendrawan@ub.ac.id

Abstract—Research and application of virtual tourism has been rapidly developing in the industrial era 4.0. However, research about perspective of tourist behavior in virtual tourism is still lacking, especially in Indonesia. This research method used is explanatory research with a survey that implemented on tourist to gamification-based virtual tourism presented of Virtual Arena in Jawa Timur Park 3. The results of the analysis shows that the ability to create virtual experiences in the form of immersion is not necessarily followed by the ability to provide telepresence experiences for a virtual destination, therefore it produces different effects on tourist behavior such as attitude and revisit intention.

Keywords—virtual tourism; gamificatio; immersion; telepresence; attitude; revisit intention

I. INTRODUCTION

A new paradigm called virtual tourism has become a buzzword in the academic and industrial world of 4.0. The belief that the massive advances of smart objects, artificial intelligence and x-reality (virtual reality, augmented reality and mixed reality) in the past few years will continue in the future has underpinned the emergence of virtual tourism. Virtual tourism is ground zero for the new phase of global tourism transformation that supported by technological innovation, generating economic opportunities and forming a new tourism sector.

Virtual tourism can be interpreted as a digital presentation of the actual tourist attraction, where geometric properties of three-dimensional space are communicated to virtual tourists (also called tele-tourists) in such a way that they can provide immersion and telepresence from tourist objects that seem to be real [1]. Virtual tourism environment is expressed as a space that is not real, but theoretically exists [2].

Virtual tourists have the advantage of using virtual tourism including being able to freely choose and adjust their needs, related with his/her tourism trips [3]. Virtual tourism can also be an alternative for people with disabilities [4], as a tourist alternative that is tourism traveling and for the treatment of traumatascap [5,6].

Virtual Reality (VR) offers many possibilities that are useful for tourism to create or expand virtual experiences that can be accepted in a tourist destination and/or used by tourists as a real alternative visit [6]. However, there is an opinion which states that virtual tourism cannot fully meet tourism needs, it can only complete the real travel [4]. This is because there are many aspects of real tourism experience that can never be fully imitated in virtual tourism.

There are several basic types of the main objects of virtual tourism [1], one of it is the use of internet applications based on software similar to computer games, where with an avatar, moves in the virtual world. Jawa Timur Park Group has created virtual tourism as a complementary part of conventional tourism-themed educational parks that they developed at Jawa Timur Park 3 in Batu City, East Java, Indonesia in the form of Virtual Arena. Basically, Virtual Arena is a visual technology-based gamification playground where it is claimed that in Indonesia this zone only exists in Jawa Timur Park 3 (figure 1).



Fig. 1. Gamified virtual tour in virtual arena Jawa Timur park 3.

The most important thing about forming a virtual experience is the capacity to provide a sense of physical presence (immersion) and psychological presence (telepresence) from visitors to the virtual environment [7]. Therefore, this study aims to evaluate the behavior of tourists that influence by immersion and telepresence which are presented in virtual environments in gamification towards

tourist attitudes [8-15]. Furthermore, the researcher also indicated that the attitude of tourists could influence the interest of tourist to revisit after they visited the virtual environment [12,16,17].

The originality offered in this research is that no other research has been found about the experience of immersion and telepresence in gamification-based virtual tourist destinations in the perspective of tourist behavior therefore, this research is the pioneer. In Indonesia there is only found research from an informatics engineering perspective by developing applications and games that are suitable for virtual tourism [18,19]. Although, some researchers have conducted research on gamification and tourism in a tourist perspective but it did not examine immersive and telepresence experiences [20-22].

Immersion is defined as a state of feeling inside and interacting with a virtual environment that provides continuous stimulation, a real illusion from reality to the senses [22]. Whereas telepresence is defined in the literature as a psychological state where a user feels immersed in a mediated virtual environment [23]. In summary, the term immersion can be said to refer to the level of objectivity regarding the accuracy of the sensors provided by virtual reality systems [24]. Whereas presence refers to the user's subjective psychological response to virtual reality systems.

Attitude is an evaluative assessment of an object that related with likes or dislikes degree [5]. While, the interest in revisiting is the possibility for tourists to visit a destination again, and this behavior is considered an expression of loyalty or concrete action that refers to the willingness of a tourist to revisit a destination of the same destination [25,26].

The framework and hypothesis of this research are formed from the underlying theoretical and empirical basis (figure 2).

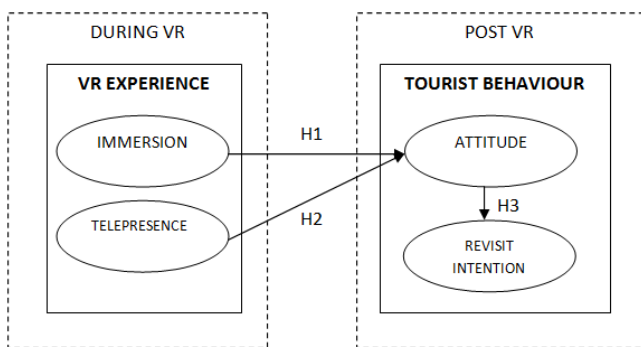


Fig. 2. Research framework and hypothesis.

II. METHODS

This research method used is the explanatory research with a survey quantitative approach [27]. The variables in this study consisted of exogenous variables, such as Immersion and Telepresence and endogenous variables, such as Attitude and Revisit Intention.

A. Sample and Data Collection

The number of sample determine in this study was carried out using the Roscoe formula therefore the number of samples in this study are 4 variables multiplied by 10, into 40 respondents [28]. The sampling method in this study was carried out with a purposive sampling approach with the sample criteria; 1) visitors of Jawa Timur Park 3 virtual arena; 2) aged ≥ 17 years and 3) have tried one virtual reality vehicle at least once.

B. Analysis Procedures (a)

In this study the data analysis method used to prove the hypothesis proposed in this study with Generalized Structured Component Analysis (GSCA) with online web-based GSCA. GSCA can be applied to small samples because of the resampling method (bootstrapping sample) [29].

C. Analysis Procedures (b)

To measure Immersion (IM) the researcher uses dimensions and indicators and consisting of Challenge Based Immersion (CI), System Immersion (SI) and Imagintive Immersion (IMA) [30,31]. Furthermore, this study measures Telepresence (TL), using MEC Spatial Presence Questionnaire (MEC-SPQ) which consists of Self Location (SL) and Possible Action (PA) [32]. In addition, for Attitude (AT) and Revisit Intention (RI), it was measured using changes after experiencing VR from the previous study [33].

III. RESULTS

A. Evaluation Result of Outer Model

The results of the suitability evaluation of variable measurement models can be seen in Table 1. Based on the test results it is known that all the criteria used have good values.

TABLE I. EVALUATION RESULT OF OUTER MODEL

| Parameter | Result of Outer Model | Rule of Thumb | Note |
|--|-----------------------|---------------|----------------------|
| Discriminant Validity Second Order Analysis | | | |
| AVE | Dimension | | 0-1 Good |
| | CI | 0.533 | |
| | SI | 0.404 | |
| | IMA | 0.590 | |
| | SL | 0.643 | |
| | PA | 0.628 | |
| | AT | 0.597 | |
| RI | 0.565 | | |
| Composite Reliability | | | |
| Cronbach's Alpha | Dimension | | ≥ 0.500 Good |
| | CI | 0.529 | |
| | SI | 0.865 | |
| | IMA | 0.857 | |
| | SL | 0.803 | |
| | PA | 0.798 | |
| | AT | 0.770 | |
| RI | 0.740 | | |

B. Evaluation Result of Inner Model (a)

Table 2 indicates that the results of the evaluation of the structural model of the overall variables in this study show good value.

TABLE II. EVALUATION RESULT OF INNER MODEL

| Parameter | Result of Inner Model | Rule of Thumb | Note |
|-----------|-----------------------|---------------|------|
| FIT | 0.530 | 0-1 | Good |
| AFIT | 0.501 | ≥ 0.500 | Good |

C. Evaluation Result of Inner Model (b)

Table 3 indicates the overall evaluation in this research that show good value.

TABLE III. EVALUATION RESULT OF OVERALL MODEL

| Parameter | Result of Overall Model | Rule of Thumb | Note |
|-----------|-------------------------|---------------|------|
| SRMR | 0.221 | Nearly 0 | Good |
| GFI | 0.977 | ≥ 0.500 | Good |

D. Evaluation Result of Inner Model (c)

Table 4 indicates the overall evaluation in this research that show good value.

TABLE 4. HYPOTHESIS TESTING RESULT

| H | Effect | Path Coefecient | CR | Note | Result |
|---|--------|-----------------|--------|-------------|----------|
| 1 | IM->AT | 0.776 | 10.77* | Sig (+) | Accepted |
| 2 | TL->AT | 0.324 | 2.33 | Not Sig (+) | Denied |
| 3 | AT->RI | 0.746 | 10.55* | Sig (+) | Accepted |

IV. DISCUSSION

Hypothesis 1 is acceptable and in line with the results of this research [8-10]. It shows that the virtual environment in the playground of virtual arena in Jawa Timur Park 3 has been able to provide challenge based immersion both motor and mental challenges and encouragement to achieve goals; provide good immersion systems such as ability to reach object, the ability to see around freely, lighting, music, vibration, sound, pixel color, graphic display, diversity of visual forms and diversity of graphic content; and build imaginative immersion from themes, characters, narratives that seem to feel in a real environment. Therefore, immersiveness is able to create changes in visitor attitudes such as feeling to like and impress towards a virtual tourist destination. The positive direction of the influence of immersion and attitudes shows that the better the immersion presented on a virtual vehicle will further increase the positive attitude of the visitor.

Moreover, hypothesis 2 is not acceptable and the results of this study are contradict with the results of research [9-15]. These results indicate that the virtual environment in the playground of Jawa Timur Park 3 virtual arena has not been able to create a feeling as if the self-location from the real location to the virtual location and closed access to the real environment and has not been able to provide the ability to possible actions such as able to move actively and freely between objects and do anything in the virtual environment. Therefore, the telepresence has not been able to create changes in visitor attitudes such as feeling to like and impress towards a

virtual tourist destination. This can be happened since the gamification presented in the virtual playground still has a short storyline or duration which make the new visitors feels limited to enjoy the immersiveness that presented and have not yet reached the expected telepresence.

Furthermore, hypothesis 3 is acceptable and strengthen the theory of Planned Behavior and is in line with the results of the study [12,16,17]. It can be said that the virtual environment in the playground of virtual arena in Jawa Timur Park 3 has been able to give a positive attitude such as feeling to like, interest, enjoy and memorable. Therefore, the attitude of visitors is able to create a desire again in the near future and the willingness to plan a repeat visit to the virtual destination. The positive direction of the relationship between the influence of attitudes and interest in revisiting shows that the better the attitude after visiting a virtual destination will further increase the interest of visitor to return.

V. CONCLUSION

Gamification-based virtual tourism that created by Jawa Timur Park 3 on a virtual arena playground is considered only capable to give a sense of immersion but is less able to provide a feeling of psychological presence (telepresence) so that the virtual experience that visitors experience inside the virtual environment cannot necessarily encourage positive attitudes and interest to revisit. In the future, virtual destination providers need to pay attention to narration, flow, the right duration and flexibility to move and interact with the virtual environment.

There are still lack of x-reality technology used in Indonesia destination therefore, further research can be carried out experimental research through on lab or web based VR [8,25]. In addition, research on the influence of virtual tourism can be carried out for traumascap, disability and elderly [6,34,35].

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