

## 360° VIRTUAL REALITY PANORAMA OF INDONESIA TOURISM

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**Abstract:** Indonesia tourism has a lot of diversity and very potential to be developed. Indonesia has a rich natural diversity both land and sea, interesting sites that have historical value and world heritage, and also have various of art and culture, making tourism sector became one of the leading sector in Indonesia. However, the travel & tourism competitiveness level in the world for Indonesia is ranked 50. Compared to neighboring countries in Southeast Asia, Indonesia was ranked fourth after Singapore, Thailand and Malaysia. One indicator of the weakness of the competitive level of Indonesian tourism is on the ICT readiness. Research methodology in data collection are observation, and literature studies. From various research and studies, the number of Android-based smartphones user in the world has increased significantly from year to year. For that reason, as one component of information technology that needs to be developed is a mobile application, that have the element of interactivity so the information can be delivered effectively. Creative concept is using virtual reality panorama technique to creating this mobile application. Virtual Reality (VR) Panorama, is an interactive way to observe photos or pictures in a wide angle panorama. It is a full 360° seamless photo of an object that tells the whole surroundings in a single frame. Tourist can explore to tourist destinations with virtual 360°, whose experiencing deeper than just a static view photos from one particular side. For potential tourists from within and outside the country could feel the first visualization, before finally visiting the tourist destinations.

**Keywords:** *Indonesia Tourism, 360° Virtual Reality Panorama, Mobile Application.*

### 1. Introduction

The tourism industry is one of the potential sector to be developed. With the diversity of cultural and natural resources make Indonesia become one of the world tourist destination.

Data from the Ministry of Tourism stated that foreign exchange earnings from this sector was ranked 4th in 2013 which amounted to 10.054,1 million USD. The number of foreign tourists reached 8.8 million people in 2014. So that, this sector has an important role after another leading sectors Indonesia, that is oil and gas, coal and crude oil palm. [1].

However data from The Travel & Tourism Competitiveness 2015 issued by The World Economic Forum ranked Indonesia at 50th in the travel & tourism competitiveness. Fall behind other ASEAN countries like Singapore (11th), Malaysia (25th) and Thailand (35th). [2]

The world tourism competitive index includes 14 indicators, that is Business Environment, Safety and Security, Health and Hygiene, Human Resources and Labour Market, ICT Readiness, Prioritization of Travel and Tourism, International Openness, Price Competitiveness, Environmental Sustainability, Air Transport Infrastructure, Ground and Port Infrastructure, Tourist Service Infrastructure, Natural Resources and Cultural Resources and Business Travel.

The weak point of Indonesia's travel & tourism competitiveness is the infrastructure sector specifically in air transport, ground and port, tourist service infrastructure, and ICT Readiness.

ICT Readiness is an indicator that covers the readiness of a country's information technology infrastructure in the tourism sector. Readiness ICT component is B2B transactions, B2C transactions, the internet user, broadband internet, mobile phone, mobile phone broadband, mobile network, and the quality of electricity,

Indonesia's ranking in ICT Readiness stands at 85. With the score 3.7 out of 7. The small score value is component of the user's Internet, broadband Internet subscription, and broadband mobile phone subscription. Nevertheless components B2B and B2C transactions have ratings high enough, with a value of 5.1 and 5.4 out of 7. It shows the readiness of Indonesia in the field of ICT for tourism is still potential for development. [2]

With the evolution of technology, especially ICT sector especially in smartphone technology also change the behavior of people in their activities. People tend to spend more time using their mobile devices in their activities. This situation also changing the behavior of tourists who planned travelling.

Research conducted by Criteo [3] in 2014 showed that there was an increase in mobile booking activities as one of B2C transaction activity. In the first half of 2014 there was 20% increase of on using of mobile devices (Android or iOS) compared with using of the desktop PC.

Many activities in traveling on mobile devices both Android and iOS bring out hundreds of applications related to travel sector, including in Indonesia. Information about the Indonesian tourist destinations applications are served with a variety of views and interface.

Indonesia's tourist destination for the tourists now very diverse. According to Wego's founder in an interview with Dailysocial [4], in 2011, 80% of Indonesian tourists looking for a vacation destination to Bali. But this time the search was more diverse travel destinations.

Based on the description above, the mobile application can be used as one of the media to inform the travel destination information to the travelers effectively.

## 2. Research Question

How to make an Android based mobile application design that describes the overall visualization and interactive on tourist spots or destination in Indonesia.

## 3. Methods

Data collection is done by literature study, observation, and data analysis. A literature study of the literature related to the travel industry and the field of virtual reality.

Observations carried out by looking for the visual aspects of the data that is visual works itself by downloading mobile applications travel to make comparisons and to document sites Indonesia and categorized according to specific thematic categories. Data analysis was done using analysis matrix as comparative references in the application design.

## 4. Discussion

### 4.1. Theory

According to Goeldner and Ritchie [5] tourists visiting a tourist destination due to seek the experience and satisfaction of psychic and physical nature. In this regard, an important factor that must be understood prior to a developed tourism destination, is the motivation of the person's background for a tour.

McIntosh [6] explains that motivation drives a person to travel are: (a) Pleasure, (b) Relaxation, rest and recreation, (c) Health, (d) Participation in sports, (e) Curiosity and culture, (f ) Ethnic and family, (g) Spiritual and Religious, (h) Status and prestige, (i) Professional or business.

If we understand the tourists' motivation, it becomes easier when it started to identify the potential tourist attraction in its territory to offer to prospective tourists.

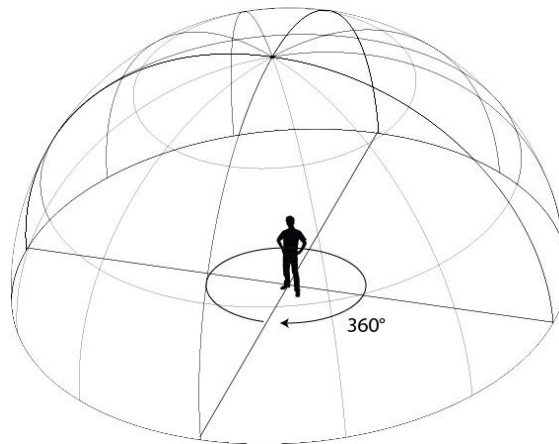
Several studies have been conducted on the relationship between information technology and tourism. Studies conducted by Jadhav & Mundhe [7], tourists needed information through technology, among others: geographic information, information needs, accommodation, transport, culture, entertainment facilities, information costs. The study concluded that the role of ICT in tourism, that is: (a) Managing destination resources, (b) Inventory of tourism resources, (c) Managing sites and attraction, (d) Identifying suitable locations, (e) Manage tourist statistics.

According to Bodker & Browning [8] the experience of the place and the making of place is the infusing of location with myriad meanings, and is a fundamental socio-cultural

accomplishment. Place is not prescriptive, but socially negotiated, contested, and dynamic.

In relation to the experience of the place, visualization tourist destinations become the important part to describe the state of the destination to tourists. Visualization of the destinations produced by using photography to create the real picture of the destination. But photography only is not enough to describe overall sides of a tourist spot. With the help of ICT, photography technique that can describe the overall experience of a place is virtual reality panorama technology.

Virtual Reality (VR) Panorama, is an interactive way to observe photos or pictures in a wide angle panorama. It is a full 360 degree seamless photo of an object that tells the whole surroundings in a single frame. It is like when we stand at a certain spot and move our body in a full circle to see the whole panorama. This preview will allow audience to grasp the actual and reality of the object, complete in 360° perspective, with no biases or artificial effect.



**Figure 1.** When we stand at a certain spot and move our body in a full circle to see the whole panorama

Some studies have also been conducted on the topic of virtual reality in relation to the tourism industries. Studies conducted by Najafipour et al. [9] states that VR's applications and implications for the tourism sector are both vast and significant, so the insights gained from tourism VR future research can provide direct, practical value to the tourism sector.

Sussman & Vanhegan [10] discusses about Virtual Reality and the Tourism Product Substitution or Complement. The research results stated that virtual holidays can not replace the real holiday experience, regardless of apparent inconveniences and environmental dangers to destinations. Also, there appears to be a virtual consensus of

holiday experiences that have a place as a preparation for visiting a destination, for disabled tourists and to experience destinations currently closed to tourists.

Studies conducted by Sambhanthan and Good [11] discusses a virtual world destination models to increase of the accessibility of tourism products has been proposed. The models has to be designed with visual and auditory experience to tourists.

Guerra et al. [12] concluded the virtual reality is the current technology that will transform the future, just like any innovation will have its use, allowing the user to new experiences, knowledge and skills, an exact reproduction of the real world that incorporates virtual display and the sensations in the surrounding environment and cultural.

Osman et al. [13] discusses aspects of usability in virtual reality applications. The research discovered user preferences towards a virtual tour for tourist destinations. It was found that the virtual tour can be used as a tool to promote tourism attractive since it provides a panoramic view as compared to still images found in brochures and websites.

Designing a mobile application need some components. One component is the user interface. The user interface is not just about buttons and menus, but the interaction between users and applications. According to Cattaneo et al. [14] in building a good user interface there are eight characteristics that must be met: (a) Clarity, clearly without ambiguity, (b) Concision, structure of compact, (c) Familiarity, familiar to users, (d) Responsiveness, to give feed back on what happened, (e) Consistency, to allow a user to learn, (f) Aesthetics, beautiful and attractive interface, (g) Efficiency, immediate access to an information, (h) Forgiveness, their means when the user made a mistake.

Another component in designing a mobile application is user experience (UX). According to Treder [15] to design a meaningful experience is to plan and act on a certain set, which result to produce planned changing in the behavior of a target group.

UX elements according to Garret [16] consists of five layers: (a) Strategy, product objectives and user needs, (b) Scope, functional specifications and content requirements, (c) Structure, interaction design and information architecture, (d) Skeleton, interface design, navigation design, and information design, (e) Surface, sensory design

#### **4.2. Data & Analysis**

Based on research conducted by McIntosh [6] concerning the tourists motivation, then tourism destinations in Indonesia are divided based on certain conditions. The division is based by region and by category. It aims to make it easier for potential tourists to choose a destination that suits their desires.

For destination by region divided into several categories of regions in Indonesia to facilitate the search. The division per region is also considered by Indonesia Ministry of Tourism's strategy that divides into Great Batam, Great Jakarta, Bali Great, Great

Yogyakarta, Great Bandung, Great Surabaya. The great concept is not only in a particular city location, but in the surrounding areas. Then there are also the cities surveyed as the best tourist city as perceived by foreign and domestic tourists who performed by Center Location Test (CLT) and published by SWA magazine [17] that is Yogyakarta, Denpasar, Bandung, Makassar, Medan, Malang. The combination of these two studies, to build tourism Indonesia VR application is divided into several regions:

1. Bali Region
2. Yogyakarta Region
3. Bandung Region
4. Makasar Region
5. Medan Region
6. Malang Region
7. Solo Region
8. Jakarta Region
9. Surabaya Region
10. Semarang Region

Indonesia Ministry of Tourism also have tourism strategy to split into 3 categories of tourism categories: Nature, Culture and Man-Made. For destination by category in building Indonesia's tourism VR application is divided into several categories of regions in Indonesia to facilitate the search

1. Natural Tourism
2. Historical Tourism
3. Museum
4. Park & Attraction
5. Cultural Performance
6. Architectural Heritage
7. Village Tourism
8. Traditional Markets

#### **4.3. Comparisons Matrix**

In developing Virtual Reality application design, required comparisons matrix against similar applications with the intention of getting the conclusion of user experience approach especially in skeleton layer that consist interface design, navigation design, and information design . Here is the comparison matrix of similar applications:

**Table 1.** Comparisons Matrix

<b>User Interface elements</b>	<b>Bandung 360</b>	<b>Octagon 360</b>	<b>Arounder</b>
Clarity	Navigation on the main menu is a bit confusing for user.	Color in subtitles in each category are not contrasts, so that no visible difference in each category.	Easy navigation for user
Concision	The flow of the layout of the main menu navigation is a bit confusing the user, because the navigation is consist of several photographs.	Navigation displayed on each page is quite clear, displayed in alphabetical and has a search engine.	Categories are displayed in alphabetical, and has a search engine for complex content
Familiarity	Familiar to navigate for user	Icon navigation in VR display have unfamiliar shape that will confuse user.	Familiar to navigate for user
Responsiveness,	Long duration to access, and error to load VR section	Long duration to access	Quite quickly, even though the content of this application contains many categories
Consistency	Consistent layout	Consistent layout	Consistent layout
Aesthetic	Color and visual component unappealing to the landing page.	There are features that the user can use the other side by using the 3D glasses, it makes the user want to use it again	Adequate
Efficiency	Quite efficient	Efficient	Efficient
Forgiveness	Long duration to access VR section	Adequate	Adequate

In the design of the user interface element that is most important is required navigation that allows users to run applications. The division of categories based search engine alphabetic and features needed on the content of complex applications. The use of color, background, and font that contrasts, the consistency of layout, use of icons that are familiar to the user, as well as ease of access



## 5. Result

### 5.1. Result of design

VR Panorama mobile application is named Virtual INDONESIA. The main identity is described by the shape of the logo icon in the form of instructions in a map marker that has become a common icon to indicate the location. Rainbow colors in the logo illustrates the diversity and richness of Indonesia with potential tourism destinations. Ranging from nature tourism, cultural tourism, historical tourism and museums..

Virtual Indonesia application shows tourist destinations of very rich and diverse Indonesia. Tourist destinations content is enriched with an interactive display 360 Panorama Virtual Reality that makes it easy for tourists to find out the true state of the tourist destinations. It is also equipped with a short description and location. Diversity tourist destination provides rich information for potential tourists and bring the spirit of the spirit of the archipelago of this beautiful archipelago.



Figure 2



Figure 3

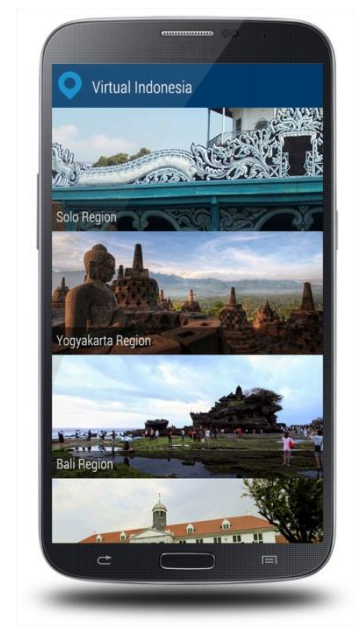


Figure 4

**Figure 2** is splash screen that appears when the user presses the application icon. The interface in the form of Virtual INDONESIA rainbow-colored logo that contrast with the dark blue background. Shades of blue will be used as the main color in the entirety of this application. This color was chosen based on the color of the sea which illustrates that Indonesia is an archipelago countries with marine richness to be one of its potential.

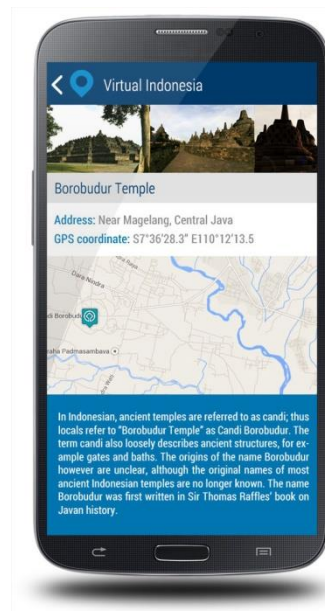


**Figure 3** is a section view of the application home. Top section is a slide show banner tourist destinations in Indonesia. In the middle section there is a virtual identity with the tag line virtual guide to exploring Indonesia. Then there are 2 main menu to browse through the tourist destinations. The first menu based by category, and the second menu based by location or area.

**Figure 4** is a section view category election by region. Selection is based on the city or region that is wider than that, as the ex residency, provinces, or island, which is considered to represent the diversity of tourism in the area. The menus in the form of a list of images, with captions underneath the name area. And this menu can be scrolled down to other options.



**Figure 5**



**Figure 6**



**Figure 7**

**Figure 5** is a section view destination by category. The category includes Natural, Historical, Museum, Park & Attraction. Each represented by icons that illustrate the category. The menus in the form of a list of images, with captions underneath destination name and a description of the number of spots in the locations that will be visualized virtual. This menu can be discroll down for other options.

When the user selects one of the destinations above, it will display the details of these tourist destinations. As shown in Figure 6 there is a scroll at the top of the image which shows a lot of spots accessible location virtually in a destination, scroll the image is shifted to the right and left to choose a spot which will be accessible virtually. At the

bottom is an information destination name, address and GPS coordinates and map locations. There is also a text description that describes a brief description of the destination.

Once the user selects one of the spots. Then came the virtual display that location as in Figure 7. The interactive display where the user can explore the full location of 360° both horizontally and vertically. Can also be carried zoom in or zoom out to see more detail parts of the site. There is a button to return to the main menu when the user wants a look at other destinations.

## 6. Conclusion

Benefits of Virtual Reality Panorama mobile application in the Indonesia tourism:

1. Mobile application facilitate the information of tourism destination to the tourists in the entire world.
2. Users can explore to tourist destinations with visual 360°, whose experience deeper than just a static view photos from one particular side.
3. For potential tourists from within and outside the country could feel the first visualization, before finally visiting the tourist destinations. Similarly to the already visited destinations, it can restore the memories.

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