

## Training on the Use of Augmented Reality Technology for UMKM Actors of Tirta Agung Tourism Sukosari Bondowoso

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**Abstract**— Village tourism is one of the villages that is now starting to attract tourists because it has an attraction that is considered unique because it is closer to various fields, both culture, economy and natural resources. Tirta Agung Tourism itself is one of the tourist destinations located in Sukosari Kidul Village, Sumberwiringin District, Bondowoso Regency. The tour, which was inaugurated on April 13, 2019, presents natural scenery and mountains in the village accompanied by several gazebos, pavilions and swimming pools that make interesting treats and are in great demand by tourists both domestic and from outside the city. Ecotourism revitalization is an effort to change the atmosphere of a dirty village into a tourist village. The method used is direct observation, analyzing needs and managing data to produce publications by utilizing augmented reality technology using marker-based AR requires special visual objects and cameras to mark them. This visual object has various forms such as QR codes or symbols. The AR device will calculate its position so that it is easy to determine the location of the content. Furthermore, the marker brings up a digital animation so that users can see it. The use of markerless AR is quite extensive, using GPS technology, digital compasses and speed meters. All of these tools are embedded in AR devices to adjust data based on the user's location. This technology is able to help publicize Tirta Agung tours with accurate updates, so that the wider community can easily obtain the latest information.

**Keywords :** Augmented Reality; Ecotourism; Enhancement; Revitalization; Tirta Agung

## 1 Introduction

Tirta Agung Village is located in Bondowoso Regency, East Java, just like any other village [1]. The village was originally a garbage dump but with the brilliant idea of the village youth [2] who wanted to change the area, all elements in the village worked together to build a tourist spot. The main goal is to change the paradigm of the wider community towards Tirta Agung Village, which has been a garbage dump. The cohesiveness of all these elements made Tirta Agung Village get the Indonesian Tourism Village award in 2022 organized by the Ministry of Tourism and Creative Economy of the Republic of Indonesia KEMENPAR/RAF RI. The long process of developing Tirta Agung tourism since 2018, one year later in 2019 Tirta Agung tourist spot was inaugurated for the public. The change from a shabby place to one of the tourist destinations in Bondowoso Regency is a form of strong desire from all villagers to make their village more advanced and widely known [3]. By utilizing existing human resources, all elements build a force to want to build changes in their village, the existence of this new tourism will generate a new economy for the surrounding residents. The construction of stands for MSME players is proof that the economic movement is getting better and there are many improvements. The existence of tourist attractions that have been

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built makes the community's economy come alive, residents are increasingly creative with the growth of new MSMEs around Tirta Agung. Some of the tourist attractions offered are natural swimming pools with running water from nature, outdoor cafes and UMKM stands [4].

Revitalization is a process carried out to revive or refresh a program or activity. So that with revitalization, the quality of a program can be improved and utilized better tirta agung. Some of the tourist attractions offered are natural swimming pools with running water from nature, outdoor cafes and UMKM stands [5]. Revitalization as a step to improve or revive an important thing in order to provide optimal results and benefits [6]. The revitalization of ecotourism encompasses a series of strategies and actions undertaken to revive, enhance, and develop ecotourism destinations. This may involve efforts to improve infrastructure, restore natural ecosystems, implement innovative technologies, sustainable management planning, effective promotion, as well as active engagement of local communities and stakeholders [7]. Revitalization is not only limited to physical and ecological aspects, but also includes social, cultural and economic elements. In the context of ecotourism, revitalization may involve the redevelopment of tourist routes, the introduction of technology-based activities, such as digital tour guide applications or the use of augmented reality technology to enhance the visitor experience. Meanwhile, an emphasis on environmental education and active community participation can be an integral part of the revitalization strategy to ensure that ecotourism activities have a sustainable positive impact on the environment and local communities [8].

Augmented Reality (AR) is a technology that combines real-world elements with virtual or digital elements. In the context of augmented reality, digital information or virtual objects are displayed on top of real-world images or displays [9]. Unlike virtual reality that creates a completely virtual environment, augmented reality enriches real-world experiences by adding layers of information or virtual elements. AR uses sensors such as cameras, motion sensors, or GPS to recognize and understand the surrounding environment [10]. The data from the real environment is processed to determine the location, orientation, and surrounding context. AR is used in a variety of fields, including education, gaming, healthcare, product design, marketing, tourism, and more. In the context of tourism, for example, AR can be used to provide historical information about a place when users point their device's camera at certain objects.

## 2 Method

### a. Research Paradigm

The type of PkM community service implementation used is a combination of quantitative and qualitative research, as research consisting of several stages to be carried out including literature study, adequate sampling based on theory, data collection, utilizing existing theories as explanatory material which ends with theory and displays calculations in the form of numbers in research.

### b. Research Approach

This section explains the approach to implementing the service, such as case studies, phenomenology, surveys, experiments, and others. In addition, the implementation approach also needs to be explained:

#### 1) Implementation time:

The research was conducted from September to December 2023.

Place of implementation:

#### 2) Place of service

The place of service was Tirta Agung Village, Sukosari, Bodowoso Regency, East Java.

#### 3) Source of service data

The data taken in this study consisted of two types of data, namely: Primary data obtained from direct observation and interviews with the manager of Tirta Agung tourist attractions using a list of questions / questionnaires that have been prepared. Secondary data obtained from Tirta Agung Office, Sukosari District, Bondowoso Regency. The method of determining the area is done objectively based on the

results of observations in several tourist attractions, according to the results of the needs analysis, the choice is in Tirta Agung Village Sukosari Bondowoso. The results of strengthening the data analysis results to increase residents' income and introduce tourist attractions widely by utilizing Augmented Reality technology...

c. Source of PkM funds

The source of funding for the service comes from a subsidy fund provided by the campus every month of Rp. 400,000 (four hundred thousand rupiah).

d. Stages of implementation

The method of implementing the service uses the PAR (Participatory Action Research) method, in the application of the method involves direct involvement of pottery craftsmen through mentoring and implementation training.

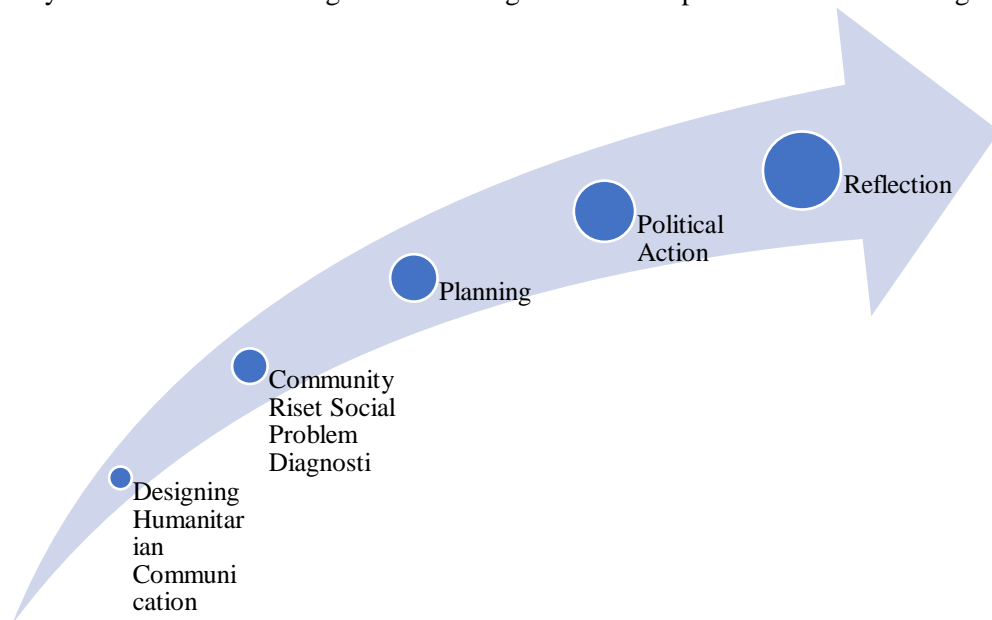


Fig 1. PAR method

As for the steps in PAR (Participatory Action Research)

1. Designing Humanitarian Communication

In social preparation this means knowing and understanding society. In this process, the facilitator mingles with the community to recognize and understand the community. Through inculturation that is built, it will create communication with the community. Because devotion thinks that if the communication built with the community is strong, it will be easier to build community participation in helping devotion. Social preparation is carried out by understanding unorganized groups in the community, understanding the role and function of institutions in the community and recognizing traditions that exist in the community. institutions in the community and recognizing the traditions carried out by the community.

2. Community Riset Social Problem Diagnosti

Analyzing existing problems in the community. By knowing and understanding the daily life of the community, the facilitator can identify problems. problems. In addition, the facilitators also conducted FGDs with the community to find out and understand the existing problems. A problem tree was also created with the community. In addition, what assistants do in analyzing the problem is by mapping, transects, understanding the flow of history and community traditions. Ven

diagram flowchart and social analysis are also used in understanding the problems that occur in the community.

3. Planning

The term people organizing or better known as community organizing is actually known as also known as community organizing is actually a self-explanatory term. is a term that already explains itself. This term does contains a broad understanding of its two root words. The term people here does not only means a specific community, in a broader context also society in general. broader context, it also refers to society in general. The term organizing here the term organizing here is more defined as an overall process framework for solving problems in society. So, it can also be interpreted as a way of approach in carrying out activities in order to solve these problems. Planning is problem solving. This problem solving is done together with the community. From the problem tree created with the community, a hope tree emerges that contains the hopes of the community in solving the problem. Facilitators together with the community plan the program that will be implemented. By making proposals and cooperating with related parties. with related parties. Facilitators together with the community hold meetings in planning activities that will be carried out. Analyzing the problems that exist in the community. By knowing and understanding the daily life of the community, assistants can identify problems. In addition, the facilitator also conducted FGDs with the community to find out and understand the existing problems. A problem tree was also created with the community. In addition, what assistants do in analyzing problems is by mapping, transects, understanding the flow of history and community traditions. Ven diagram flowchart and social analysis are also used in understanding the problems that occur in the community.

4. Political Action

That is, forming new social groups. This is done for problem solving. By building leadership or a leader who can organize the community and can conduct directional analysis so as to encourage transparency over all parties and all problems. encourages a process of transparency for all parties and all problems. Activity This activity is carried out with community participation. The action taken answers expectations of the community. In building community participation before taking action is not intended to foster participation in name, passive participation, participation through consultation or functional participation. Rather, the participation that participation is interactive participation, where ideas in various activities from planning to evaluation involve the active role of the community. planning and evaluation involve the active role of the community. So it is expected that community can take their own initiative, carry out activities independently and mobilize the resources needed from the community itself. and mobilize the resources needed from the community alone.

5. Reflection

It is the action of the results of activities or assessing the successes and shortcomings of all activity components towards the social change that is the vision of the community. activities towards social change that becomes the vision of the community. The facilitator reflects and analyzes the results of the activities that have been carried out.

### 3 Findings And Discussion

#### 3.1 Finding

This service activity was carried out to gain a deep understanding of visitor performance and characteristics, and to identify factors that can affect visitor satisfaction at Tirta Agung Tourist Attraction.

1. Trainee profile

From the sample of 500 respondents, the majority of visitors (60%) were families, followed by couples (25%) and tourist groups (15%). This demographic distribution creates a picture of the dominant visitor segments at Tirta Agung.

2. Visiting trends

Analysis of daily visitation data over the year shows an upward trend in visitation during holiday seasons and weekends. Peak visitation occurs in July, where the number of visitors reaches its highest.

3. Visitor Satisfaction

A survey using a Likert scale showed that 85% of visitors rated their experience at Tirta Agung as "satisfied" or "very satisfied". Factors such as service quality, cleanliness, and natural scenery play a major role in increasing satisfaction levels.

4. Queue at the entrance ticket area

Queuing data at the entrance ticket area shows that around 20% of respondents experienced queue-related inconveniences or complaints. Visitors stated that long waiting times can affect their overall visit experience.

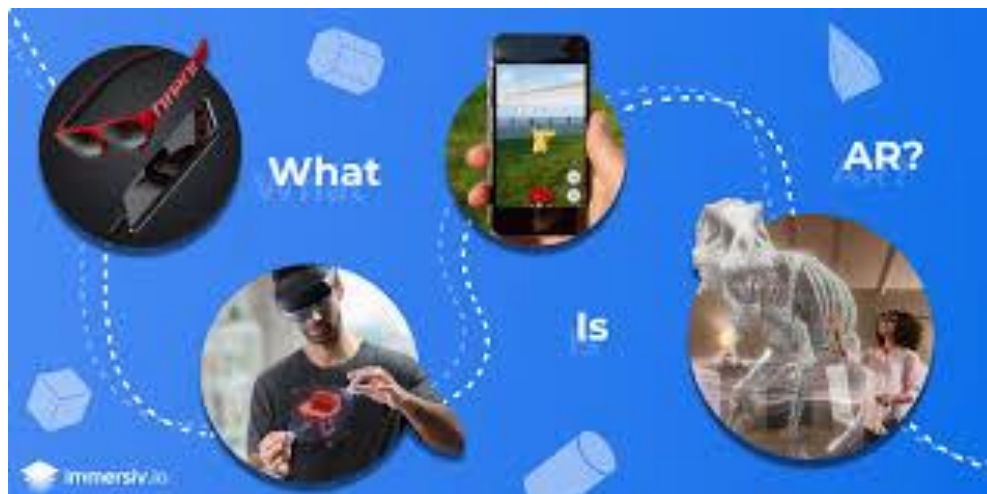
5. Visitor spending

The average visitor expenditure on tickets, food and souvenirs during a visit is approximately IDR 30,000. This data creates an understanding of the economic contribution generated by visitors during their visit.

6. Marketing strategy

From the analysis of demographic data, it can be seen that promotion by utilizing Augmented Reality technology aims to increase visitors with online promotion.

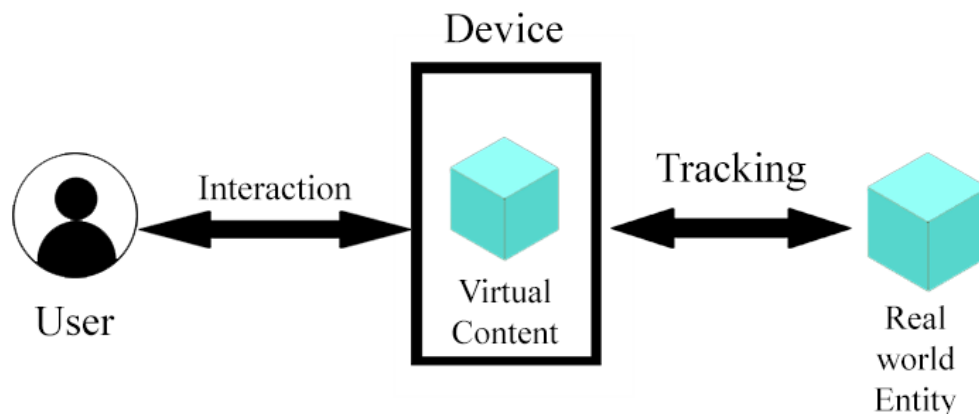
The process of the work system Augmented Reality Technology



**Fig 2.** Augmented Reality Flow

This Architecture comprised of all above components and interactive relationship between them helps to develop augmented reality working model.

1. **User:** The most essential part of augmented reality is its user. The user can be a student, doctor, employee. This user is responsible for creation of AR models.
2. **Interaction:** It is a process between device and user. The word itself consist of its meaning some action perform by one entity as result in creation or some action performed by other entity.
3. **Device:** This component is responsible for creation, display and interaction of 3D models. The device can be portal or in static state. Example, mobile, computer, AR headsets etc.
4. **Virtual Content:** The virtual content is nothing but the 3D model created or generated by the system or AR application. Virtual content is type of information that can be integrated in real world user's environment. This Virtual content can be 3D models, texture, text, images etc.
5. **Tracking:** This component is basically process which makes possible creation of AR models. Tracking is sort of algorithm which help to determine the device where to place or integrate the 3D model in real world environment. There are many types of Tracking algorithm available which can be used in development of AR applications.
6. **Real-life entity:** The last component AR architecture is real world entities. This entities can be tree, book, fruits, computer or anything which is visible in screen. AR application does not change position of real life entity. It only integrate the digital information with this entities.



**Fig 3.** Architecture

### 3.2 Discussion

Based on the results of a survey conducted in the field through the distribution of questionnaires regarding the satisfaction of UMKM at the Tirta Agung Wonosari Bondowoso tourist spot, the income of the respondents can be seen in the table below.



**Table 1.** User satisfaction

No	Questions	Respondents' responses				
		SS	S	N	TS	STS
MARKET ANALYSIS						
1.	Tourism profile	30	8	2		
2	Visitation trends	34	6			
3	Potential for improvement UMKM	35	3	2		
4	Strengths and weaknesses of attractions	30	5	5		
MARKETING GOAL SETTING						
5	Specific marketing	38	2			
6	Increase visitors during the holiday season	30	6	2		
MARKET SEGMENTS						
7	Analyzing visits	29	8	3		
8	Applying market segmentation	32	3	5		
POSITION DEVELOPMENT						
7	Differentiation factor	30	3	2		
8	Tourist attraction positioning	25	10	5		

Based on the data of respondents' responses to the statements in the study, several conclusions can be drawn that describe their views on various aspects related to market analysis, setting marketing objectives, market segmentation, and developing the position of Tirta Agung Wonosari Bondowoso tourist attraction. The majority of respondents (30) strongly agreed with the analysis of Tirta Agung Wonosari Bondowoso's tourism profile, indicating that their understanding of tourism potential is quite good. Likewise with visitation trends, where most respondents (34) recognized and agreed with existing visitation trends. Respondents tended to be positive (35 strongly agreed) towards the potential for increasing Micro, Small and Medium Enterprises (UMKM) in Tirta Agung Wonosari Bondowoso Tourism. This shows that they recognize the important role of UMKM in tourism and local economic development. Most respondents (30 strongly agreed) recognized the strengths and weaknesses of the attraction, providing a strong picture of the aspects that need attention for further development. Setting specific marketing objectives received strong support from respondents (38 strongly agree). This shows consensus in formulating clear objectives to support the marketing strategy. The application of market segmentation also received a positive response, with the majority of respondents (32 strongly agreed) recognizing the need for a focused approach to specific market segments. The factor of differentiation and placement of tourist attractions was also recognized by respondents (30 strongly agreed and 25 strongly agreed). This indicates their understanding of the importance of differentiating and placing attractions well in the perception of tourists.

#### 4 Conclusion

In general, respondents showed positive perceptions of aspects of market analysis and marketing at Tirta Agung Wonosari Bondowoso Tourism. There was a good understanding of the potential of UMKM and the need for a focused marketing strategy. Further recommendations can be directed at utilizing the results of this analysis for the improvement and development of more effective marketing strategies, taking into account the strengths and weaknesses of tourist attractions and supporting the sustainable growth of UMKM.

#### 5 References

- [1] W. Amilia, A. S. Rusdianto, I. B. Suryaningrat, R. C. Prasetya, N. Fatimatuzzahro, H. Sampurna and T. T. Baladraf, "Analisis Risiko Pengembangan Wisata Kuliner Tirta Agung Di Kabupaten Bondowoso," *urnal Industri Pariwisata*, pp. 90-101, 2023.

- [2] N. F. Hidayati, M. Rizal and S. Sholehuddin, "Analisis Strategi Wisata Tirta Agung Dalam Upaya Pengembangan Pariwisata Di Kabupaten Bondowoso," *E-JRM: Elektronik Jurnal Riset Manajemen*, pp. 90-105, 2023.
- [3] R. Rokhani, F. Aji, A. Anwar and A. Badrudin, "Optimalisasi Potensi Kuliner Desa Sukosari Kidul Melalui Pasar Lereng Raung," *Warta Pengabdian*, pp. 65-79., 2023.
- [4] Y. Subaktilah, N. Kuswardani and S. Yuwanti, "Analisis SWOT: Faktor internal dan eksternal pada pengembangan usaha gula merah tebu (Studi Kasus di UKM Bumi Asih, Kabupaten Bondowoso)," *Jurnal Agroteknologi*, pp. 107-115, 2018.
- [5] R. Naldi and B. Emely, "Ekowisata Sebagai Upaya Revitalisasi Pesona Indah Danau Maninjau," *Panorama: Jurnal Pariwisata, Sosial dan Budaya*, pp. 45-52, 2023.
- [6] A. Kurniawan and N. A. Nyoman, "Revitalisasi Kawasan Pantai Mertasari Sebagai Daerah Ekowisata.," *Jurnal Abdi Daya*, pp. 12-24, 2022.
- [7] A. E. A. C. Habibah, I. Mushrifah, H. J. S. Sivapalan, A. Buang and S. S. Mastura, "Revitalizing ecotourism for a sustainable Tasik Chini biosphere reserve," *Asian Social Science*, pp. 70-79, 2023.
- [8] Y. Tang, "Discrete dynamic modeling analysis of rural revitalization and ecotourism sustainable prediction based on big data," *Discrete Dynamics in Nature and Society*, pp. 1-9, 2022.
- [9] R. E. Saragih, "Development of interactive mobile application with augmented reality for tourism sites in Batam. In 2020," *Fourth World Conference on Smart Trends in Systems, Security and Sustainability*, pp. 512-517, 2020.
- [10] H. Kim, Y. T. Kwon, H. R. Lim, J. H. Kim, Y. S. Kim and W. H. Yeo, "Recent advances in wearable sensors and integrated functional devices for virtual and augmented reality applications," *Advanced Functional Materials*, pp. 31-39, 2021.
- [11] R. Naldi and B. Emely, "Ekowisata Sebagai Upaya Revitalisasi Pesona Indah Danau Maninjau," *Panorama: Jurnal Pariwisata, Sosial dan Budaya*, pp. 45-52., 2023.
- [12] A. Sanjaya, D. Saputra and F. Fourqoniah, "Revitalisasi Ekowisata Pantai Biru Kersik Kabupaten Kutai Kartanegara melalui Gerakan Penanaman Mangrove," *Jurnal Buana*, pp. 121-131, 2022.
- [13] A. R. Sumartini, N. L. P. Indiani and L. G. P. S. E. Jayanti, "Pemberdayaan UMKM, Pencegahan Stunting, dan Revitalisasi Destinasi Ekowisata di Kelurahan Penatih, Kecamatan Denpasar Timur, Kota Denpasar," *Community Service Journal (CSJ)*, pp. 62-68., 2023.

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