AUGMENTED REALITY AS A LEARNING FOR PROCESSING AND MARKETING WATER HYACINTH PRODUCTS IN PERUM JASA TIRTA II WITH PRISM METHOD

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Abstract: Perum Jasa Tirta II (PJT II) has launched the “Clean Lake Gold Achieved” program, aimed at utilizing water hyacinth in the Jatiluhur waters to create economically valuable handicrafts and organic fertilizers. In an effort to support its fostered MSMEs (Micro, Small, and Medium Enterprises), PJT II intends to use Augmented Reality (AR) technology as a learning and marketing tool to facilitate the study and marketing of water hyacinth products by PJT II's MSMEs. The method used is a Systematic Literature Review guided by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), which includes identification, screening, inclusion, and eligibility of literature. The results of the PRISMA method identified 7 (seven) articles that meet criteria such as the year of publication in the last 5 years, related to AR, MSMEs, Learning, Innovation which are used as references for this study, which show that the application of AR in PJT II-assisted MSMEs can improve efficiency and product quality, as well as offer greater innovation and appeal to the market. The implementation of AR has proven effective in enhancing consumer engagement and supporting local economic growth.

Keywords: Augmented Reality, MSMEs, Water Hyacinth, Marketing, Processing, Perum Jasa Tirta II

INTRODUCTION
Water hyacinth is a nuisance aquatic plant in tropical countries. This plant reproduces very quickly which has the potential to damage waters so that it has a negative impact such as blocking sunlight from entering the water surface, and silting up rivers [1]. Water hyacinth can have value if it is managed and utilized with innovation and creativity to become craft products that have economic value [2].

Water hyacinth products are a form of art category developed by UMKM assisted by Perum Jasa Tirta II which has economic value. MSMEs (Micro, Small and Medium Enterprises) have an important role for the community's economy and welfare in making products and innovations. Perum Jasa Tirta II has a program themed “Clean Lake Gold Achieved” which has invited the community to utilize water hyacinth in Jatiluhur waters into crafts and organic fertilizer [3].

Based on the above, Perum Jasa Tirta II wants to use multimedia technology to help MSME players in processing water hyacinth and help marketing water hyacinth products. The multimedia technology is Augmented Reality (AR) which is used to help MSMEs display visuals of how to process water hyacinth into handicraft products and fertilizers and display visuals of water hyacinth products as a form of marketing in attracting buyers using smartphones. Augmented Reality (AR) creates a new environment by combining the interactivity of reality objects and virtual objects into one device such as Android, Windows, IOS and so on [4]. This research aims to provide convenience in learning the processing and marketing of water hyacinth products in MSMEs. The UMKM players assisted by PJT II.

LITERATURE REVIEW
a. Augmented Reality
Augmented Reality (AR) is a virtual technology that is converted into real life. The concept used in AR is to use a 3D environment derived from a computer so that users can cross the threshold and interact with a synthetic environment. So that users can simulate the form of reality [4]

b. MSME
MSMEs (Micro, Small and Medium Enterprises) is a business that has a productive economic aspect and is not a subsidiary of a central company that has a total capital as regulated by law [5]

c. Previous Literacy
Based on previous literature, water hyacinth proliferates rapidly and can damage aquatic environments by covering the water surface, threatening aquatic life, and causing problems such as reduced water quality, rapid water evaporation, and sedimentation. The aim of this study is to involve PT Pegadaian in the collaborative program “Turn Weeds into Gold” at Jatiluhur Reservoir and to identify the benefits of the program from ecological, economic, and social aspects. The method used involves collecting more than 50 articles, books, and research reports. The results of this study include the ecological aspect, where controlling the growth of water hyacinth can prevent problems such as rapid water evaporation and sedimentation, which can cause reservoir shallowing. The economic aspect shows that the surrounding
community experiences increased income from the sale of products such as active humus/compost and POC/enzymatic products made from water hyacinth. The social aspect shows the establishment of harmonious relationships between PT Pegadaian, PTI II as the reservoir manager, and the surrounding community through collaboration in this program.[5]

The next literature concerns the contribution of home-based enterprises (Home-Based Enterprises, HBE) using water hyacinth to the income of business actors in the Rawapening area through the use of the internet. The methodology used is quantitative with 60 respondents from HBE business actors, classified into digital HBE (utilizing the internet) and non-digital HBE (not utilizing the internet). The results of the study show that the use of the internet by digital HBE actors in the Rawapening area significantly contributes to increasing income compared to non-digital HBE actors. Innovation and the adoption of information technology play an important role in supporting the success of home-based businesses. Business actors make better use of internet technology to increase the efficiency and competitiveness of their businesses.[6]

The next literature is the Utilization of Augmented Reality (AR) Technology in the Design of eBrouchure as Android-Based Promotional Media. This research is motivated by the rapid development of information technology, especially Augmented Reality (AR) technology, and the desire to make promotional media more attractive and informative. Conventional brochures are considered less interactive and require innovation to attract public interest. The results showed that the AR-based eBrouchure application was successfully developed and tested well. This application is able to display interactive 3D objects and provide a more interesting and informative promotional experience than conventional brochures. [7]

The next literature is Utilization of Digital Marketing for MSMEs. This paper discusses changes in the marketing system from traditional to digital marketing to face the 5.0 era. Many MSMEs do not understand digital marketing. The purpose of this service activity is to provide knowledge and training on digital marketing to MSME players in Teluk Pucung Village, North Bekasi. The methods used include lectures, discussions, and hands-on training. As a result, participants gained additional knowledge about digital marketing, including how to create persuasive content and captions for Instagram.[8]

**RESEARCH METHODS**

This research method uses Systematic Literature Review with Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) which consists of identification, screening, eligibility and included. Articles taken based on data related to Augmented Reality will then be analyzed.

![Figure 1. Methods Prisma](image)

**a. Identification**

The initial process of this method involves identifying literature by using databases such as Google Scholar and Scopus. Keywords like MSMEs, Augmented Reality, Water Hyacinth, Innovation, Promotion, and Education are used, and a time period is determined; in this study, a five-year period from 2019 to 2024 is used, with publications in both Indonesian and English. Data obtained based on the specified keywords resulted in 20 articles from Scopus and 20 articles from Google Scholar. The sources of the articles include both national and international articles.

**b. Screening**
Data screening is used to filter the data that has been obtained so that the data is in accordance with the topic that will be discussed. Obtained so that the data is in accordance with the topic to be discussed. Screeners in the form of national and international journals related to Augmented Reality and MSMEs, fully accessible (full text), and using Indonesian and English. From the results of filtering the appropriate data obtained as many as 5 findings in English and 10 findings in Indonesian.

c. Eligibility
After filtering, the researcher determines which journals will be used as relevant literature review materials. The journal used as material is a journal that is relevant to the topic of discussion, namely Augmented Reality for Water Hyacinth MSMEs Perum Jasa Tirta II.

d. Include
After the journals meet the eligibility criteria, the number of journals to be studied. The final journals used as research material were 7 journals with 3 English-language journals and 4 Indonesian-language journals.

RESULTS AND DISCUSSIONS

a. Results
This research aims to understand the theories used by other researchers in analyzing Augmented Reality for the promotion and learning of MSMEs. To achieve this goal, the research identifies the factors used in previous studies, including the applied theories, year of publication, previous research results, as well as the types of literature and tools used in processing the research data.

Out of the 40 articles identified, 35 articles did not meet the criteria. Here are the 7 articles that meet the eligibility criteria:

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<td>1</td>
<td>Muhammad Arifiyanto, 2022, Introduction to Digital Marketing: Augmented Reality Marketing as a Promotional Medium for MSMEs in Samborejo Tirto Village, Pekalongan City. [9]</td>
<td>Samborejo Village, Tirto Subdistrict, Pekalongan Regency, Central Java, Indonesia</td>
<td>This community service activity successfully increased participants' knowledge about digital marketing, including augmented reality marketing. This improvement is evidenced by the pre-test and post-test results, which show an increase in participants' understanding. The knowledge gained is expected to be implemented in the business activities owned by the participants.</td>
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<td>2</td>
<td>Monica Hartanti dan Nina Nurviana, 2019, Kajian Kesiapan Masyarakat Menerima Penggunaan Teknologi Augmented Reality: Studi Kasus Desain Kemasan Oleh-oleh UMKM Khas Jawa Barat[10]</td>
<td>West Java, Indonesia</td>
<td>This research reveals that Augmented Reality (AR) technology is still considered new by consumers, producers, and the Department of Trade and Industry. The majority of respondents perceive AR as more suitable for young people and more appropriate for implementation in big cities. The study shows that AR has the potential to be an effective promotional tool that can provide broader information about products, local culture, and tourist attractions. However, currently, the community is not fully ready to use AR technology in souvenir food packaging design. Nevertheless, AR can add functional value to the souvenir food packaging design as a representative of local culture.</td>
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<td>3</td>
<td>Yohanes Eudes Hugo Maur dan Suyoto, 2022, Designing Augmented Reality and Chatbot as Tourist Assistants: Case Study West Manggarai [11]</td>
<td>Jakarta, Indonesia</td>
<td>This study examines the use of Augmented Reality (AR) technology and chatbots as tourist assistants to enhance the tourist experience in West Manggarai. AR allows tourists to view additional</td>
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<td>4</td>
<td>Regina Carmelita Kristofani, Yudhistya Ayu Kusumawati, dan Mardhatillah Shanti, 2022, Banyan: Generating Micro, Small, and Medium Enterprises through Augmented Reality [12]</td>
<td>Prapat, Indonesia</td>
<td>This research discusses the use of Augmented Reality (AR) technology to support the development of Micro, Small, and Medium Enterprises (MSMEs). AR is used as an innovative tool to enhance customer engagement and promote MSME products interactively. Studies show that AR can provide a more immersive and engaging experience for consumers, which in turn can increase sales and brand awareness. The implementation of AR technology in MSME marketing strategies can help small businesses compete more effectively with larger companies by leveraging advanced technology to attract and retain customers. In conclusion, AR has great potential to empower MSMEs and support local economic growth.</td>
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<td>5</td>
<td>Ainiyah Hidayanti Yusup, Asma Azizah, Endang Sri Rejeki, Meliza Silviani, Ending Mujahidin, Rudi Hartono, 2023, Literature Review: The Role of Augmented Reality-Based Learning Media in Social Media [13]</td>
<td>Indonesia</td>
<td>This study reviews the role of Augmented Reality (AR)-based learning media in social media, especially in the era of Society 5.0, which offers connectivity between humans, machines, and the environment. The research shows that the integration of AR technology with social media platforms like Instagram can enhance learners’ motivation, interest, and curiosity. Using AR as a learning medium on social media creates an inclusive, accessible, and engaging learning environment for the digital generation. AR allows lessons to be delivered interactively and visually, expanding the reach of learning that can be accessed anytime and anywhere with the support of adequate cameras and smartphones. In conclusion, the utilization of AR in social media has proven effective in improving the quality and participation in learning.</td>
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According to some of the journals presented above, there is a correlation between Augmented Reality (AR) and the development of Micro, Small and Medium Enterprises (MSMEs) such as increasing knowledge and understanding of the use of AR as a promotional medium and the effectiveness of AR as a promotional tool.

b. Discussions

1. Increased knowledge and understanding of the use of AR as a Promotional Media

Some MSMEs in Indonesia have used AR as a promotional media, for example, research by Muhammad Arifiyanto (2022) shows that the use of AR as a digital marketing promotional media can increase participants' knowledge and understanding of digital marketing, which in turn can be implemented in MSME businesses to increase engagement and sales. [9]

Perum Jasa Tirta II water hyacinth processing MSMEs can apply AR as a promotional media for water hyacinth crafts, Perum Jasa Tirta II must provide knowledge and understanding to MSME entrepreneurs about digital technology and AR that can help them increase marketing effectiveness and market competitiveness. How to improve and understand the use of AR as a Promotional Media is as follows:

a. Conducting training and education for MSME players on how AR technology in marketing strategies is very important. This includes how to create AR content, integrate AR into promotional media and maximize AR interactivity.

b. Conducting workshops and seminars involving AR technology experts and marketing practitioners can help improve MSME players’ understanding of the potential and application of AR.
c. Studying case studies from other MSMEs that have successfully used AR as a promotional medium can provide insight and inspiration for Water Hyacinth MSMEs at Perum Jasa Tirta II.

2. Effectiveness of AR as a Promotional Tool
Monica Hartanti and Nina Nurviana (2019) revealed that AR technology has the potential to be an effective promotional tool. AR can also convey broader information about products, local culture and tourist attractions, which can increase brand awareness and attractiveness of MSMEs [10]. The following is the effectiveness provided by AR:

a. Interactivity and Engagement, AR allows consumers to interact with products virtually, increasing their involvement. Consumers can see how water hyacinth products are used/ performed in their own environment through digital devices.

b. Immersive Experience, AR provides an immersive and interactive visual experience, which makes the product more attractive and enticing to consumers. For example, consumers can see the process of making water hyacinth crafts which can increase their appreciation of water hyacinth crafts.

c. Effective information delivery, AR can deliver product information in a more engaging and interactive way. Consumers can find out more about the craft materials and environmental benefits of water hyacinth products.

3. Implementation of AR in UMKM Perum Jasa Tirta II

a. AR Application for Water Hyacinth Products: Develop an AR application that consumers can use to scan products or brochures and view additional content such as making videos, product information, and other interactive features.

b. Promotional Campaign with AR: Launch promotional campaigns that use AR to capture consumer attention on social media and other digital platforms. For example, using AR filters on Instagram that show water hyacinth products in different forms and uses.

c. Collaboration with Influencers: Engaging influencers who can promote products through AR content, thus reaching a wider audience and increasing brand awareness. Bagian Hasil dan Pembahasan merupakan bagian yang memuat semua temuan ilmiah yang diperolehnya hasil-hasil tersebut yang dideskripsikan secara jelas, lengkap, terinci, terpadu, sistematik, serta berkesinambungan.

CONCLUSIONS

Based on the results of SLR research using the Prisma method to identify and reveal theories about the topic to be researched. Based on 40 (forty) articles that have been reviewed, with a time span of publication from 2019 to 2024. It was found that 7 (seven) articles met the category and were used as references for this research. The results of this study indicate that Augmented Reality (AR) has great potential when applied to MSMEs assisted by Perum Jasa Tirta II, namely helping to improve product efficiency and quality, but also offering added value in terms of innovation and market attractiveness. AR implementation can empower MSMEs, increase consumer engagement, and support local economic growth.

Implementation of AR in UMKM Perum Jasa Tirta II by conducting training and education for MSME players who present AR technology experts and marketing practitioners, Promotional Campaigns with AR and collaboration with influencers.

REFERENCES


