Integrating Artificial Intelligence and Digital Marketing To Enhance Msme Competitiveness in Geotourism: A Participatory Training Model in The Pangandaran Geopark

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Abstract.

This community service program aims to enhance the competitiveness of micro, small, and medium enterprises (MSMEs) engaged in geotourism within the Aspiring Pangandaran Geopark through the integration of Artificial Intelligence (AI) and digital marketing using a participatory training model. MSMEs in the region face challenges such as limited digital innovation, inadequate technological access, and low capability in social media-based promotion. To address these issues, the program applied a participatory approach and speculative design thinking involving MSME owners, academics, and tourism destination managers in collaborative learning. The training consisted of three main modules: (1) digital literacy and cybersecurity for entrepreneurs, (2) the use of AI in digital marketing strategies (AI-driven storytelling, content generation, and consumer analytics), and (3) creative promotional artifact development based on local geodiversity and biodiversity. The results indicate significant improvements in participants' ability to create digital content, understand online market opportunities, and utilize basic AI tools (chatbots, image generators, and social media analytics) to expand promotional reach. The participatory training model demonstrated positive social impacts, including strengthened MSME community networks, increased visibility of geopark-based products, and contributions to sustainable local economic development. The findings confirm that integrating AI and digital literacy represents an innovative strategy for community-based MSME empowerment in geopark areas.

Keywords: *Artificial Intelligence; digital marketing; MSME; geotourism and community empowerment.*

I. INTRODUCTION

Digital transformation has become a key driver of the competitiveness of micro, small, and medium enterprises (MSMEs), particularly in the tourism sector. In Indonesia's developing geoparks, MSMEs play a crucial role in driving sustainable tourism and local economic growth.The Pangandaran region has a poverty rate of 8.75% and manufacturing industry growth reached 5.10% between 2016 and 2021, indicating strong potential for geotourism-based business development. However, MSMEs operating in the Pangandaran Aspiring Geopark face several obstacles, such as limited digital capacity, low innovation in online promotions, and a lack of knowledge about the application of artificial intelligence (AI) in marketing.This community service activity was designed as a pilot project in Margacinta Village, Cijulang District, involving the Margacinta Tourism Group (Pokdarwis) and local MSME managers. The approach used emphasized a participatory approach to generate innovations based on collaboration between academics, local government, and the community. This community service program integrates AI and digital literacy through a participatory approach to strengthen the competitiveness and sustainability of MSMEs. AI integration is expected to increase the effectiveness of digital promotions, expand online markets, and raise awareness of geoparks as sustainable tourism destination brands.

II. METHODS

This community service program utilizes a Participatory Action Research (PAR) approach combined with speculative design thinking. The process consists of four main stages: (1) needs assessment through observation, interviews, and questionnaires; (2) AI-based digital literacy and marketing training, including content creation, storytelling, and consumer analytics; (3) a speculative design workshop to design creative

promotional artifacts based on geodiversity and local culture; and (4) participatory evaluation to measure participants' capacity building.

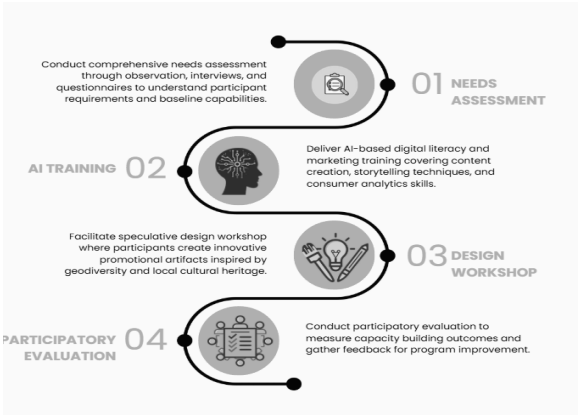

Fig 1. FlowChart of Community Service Activites

Within this framework, the training is designed using a participatory approach. The participatory approach in CSP training is understood as a way of designing, implementing, and evaluating training by actively involving participants as the primary agents, from identifying needs and formulating materials to developing solutions and reflecting on the results. The facilitator is not merely a presenter of materials, but also acts as a co-designer and mentor, managing the dialogue, highlighting the local context, and facilitating experiential learning. Various studies have shown that participation-based training can improve participants' learning experiences, motivation, and confidence in applying knowledge in the field [1-3]. Compared to conventional training, which tends to be one-way and resource-centered, this approach stands out for several characteristics:

Active involvement of participants in designing content, selecting case studies, and testing real-world solutions in their own business or community environments [1-2].Application of adult learning principles, where materials and activities are designed in alignment with prior experience, practical relevance, and the actual needs of CSP participants [1].

1. Use of interactive and context-based methods, such as workshops, problem-based exercises, simulations, and guided discussions, which encourage collaboration and in-depth reflection [3-4].

2. Continuous learning through mentoring, so that training does not stop at a single session, but is followed by short- to medium-term guidance to ensure the transfer of knowledge to business practice [5].

Empirically, a participatory approach has proven effective in various training contexts, for example, in health worker capacity building programs, data management, digital literacy, and community-based entrepreneurship programs [3, 1, 6]. The same pattern is adopted in this CSP: participants not only receive materials on AI and digital marketing, but also practice developing case studies and promotional solutions for their own businesses, discuss experiences, and receive direct feedback. This hands-on activity strengthens ownership of the learning outcomes and encourages practical application in geotourism MSMEs. The participatory approach in this CSP training is implemented through several operational steps:

The joint planning phase involved Pokdarwis (Tourism Groups), MSMEs, and village government representatives to identify key needs (e.g., low digital literacy, lack of local narratives in promotions, and unfamiliarity with AI). This phase also established training objectives and success indicators based on the local context.Curriculum and case study co-design, where the academic team and participants developed content themes, selected the most relevant digital platforms (Instagram, TikTok, WhatsApp Business), and designed case studies based on real-life products such as eco-print batik, honey, honje juice, and local culinary delights.Interactive learning methods included content creation workshops, simulations on the use of AI tools (chatbots, image generators, and caption writing), reflective discussions on field challenges, and hands-on practice in uploading and analyzing content on social media. Post-training support included follow-up communication and simple technical guidance, such as helping participants set up business accounts, test various content formats, and analyze social media insight data.Formative and summative evaluations measured not only knowledge gains but also participant engagement, the relevance of the material to their

businesses, and follow-up plans for the community. Evaluation instruments included pre- and post-training questionnaires, observation sheets, and open-ended questions regarding implementation experiences and barriers. Indicators of successful participation included: increased active participation in discussions and practices, increased participant confidence in using AI and social media for promotion, and the emergence of independent initiatives to develop new content [1, 2, 4, 6].

However, participatory approaches also have limitations. The process of joint planning, mentoring, and participatory evaluation requires more time and resources than one-way training, and requires qualified facilitators who are able to understand the local context and manage group dynamics [1, 3]. Furthermore, attention to stakeholder representation is needed to ensure that the voices of vulnerable groups—such as very small-scale MSMEs or women entrepreneurs—are accommodated in training design and implementation. In the context of the Community Service Program (CSP)) in Pangandaran Geopark, the participatory approach and the use of AI ensure that the training not only targets technical skill development but also encourages participants to imagine a future of geotourism marketing based on technology and local wisdom. Thus, the methods used not only result in increased individual capacity but also encourage the formation of a collaborative learning ecosystem that supports the sustainability of MSME businesses in the geopark area. The quantitative and qualitative evaluation instruments used in this program were then analyzed descriptively and comparatively to examine changes in levels of understanding, perceived relevance of the material, and AI implementation plans following the training. The results of this analysis form the basis for the discussion in the next section regarding increasing digital literacy, adopting AI, and strengthening geotourism MSME networks.

III. RESULT AND DISCUSSION

Training and mentoring for MSMEs in the Pangandaran Geopark area resulted in significant capacity building in digital literacy and the application of artificial intelligence (AI) in marketing strategies. The training was attended by MSMEs from Margacinta Village and the surrounding areas engaged in culinary, craft, and geodiversity-based products such as natural batik, honey, and processed local plants. Evaluation results showed that most participants previously had a very limited understanding of AI and digital marketing. After the training, their understanding increased significantly—over 60% of participants stated they understood the basic concepts of AI and began using it for content automation, promotional design, and analyzing customer interactions on social media.Participants assessed the training materials as highly relevant to their business needs, particularly in the areas of digital storytelling and the use of AI to support promotional creativity. Most stated that the training helped them shift their mindset from simply promoting products to developing branding rooted in the potential of local nature and culture. Survey results showed that the majority of participants intend to implement AI in their businesses within three months, particularly to accelerate content production and analyze digital market trends.

Fig 2. Fieldwork in The Village Discussion with MSMEs

In addition to increasing individual capacity, the social impact is the formation of collaborative networks among MSMEs through local digital communities. Participants actively share promotional work and hold discussions through online groups to maintain continuity of learning. The PAR approach used in the

training sparked unique promotional innovations, such as the "GeoStory Pangandaran" tourism campaign concept and digital promotional artifacts based on geosite photos, interactive maps, and an online catalog of local geoproducts.

The program's main outputs include several concrete products:

1. Digital educational and promotional videos showcasing the training process and MSMEs' work, broadcast on the TVRI West Java YouTube channel for public dissemination.
2. Online media publications (e.g., Tribun Jabar) covering the success of the CSP training to promote the program's sustainability.
3. A CSP intervention model based on speculative design that can be replicated in other tourism villages as a best practice for empowering geopark MSMEs.
4. Training artifacts include posters, short videos, and a digital geoproduct catalog design that illustrates the geotourism narrative and local identity.
5. Improving participants' skills in using digital tools, managing social media accounts, and developing local geotourism-based brands.

The impact analysis also shows that this activity contributed to strengthening the geobranding of Pangandaran Geopark. AI-based promotion and digital content made the geotourism narrative more engaging and accessible to the public. The participatory approach implemented made MSMEs not merely beneficiaries but also co-creators in building the image of a tourist destination based on geology, culture, and creativity. In this way, CSP activities directly contribute to the achievement of SDGs 8 (Decent Work and Economic Growth) and SDG 12 (Sustainable Consumption and Production).Overall, the CSP results demonstrate that the integration of AI, speculative design, and a participatory approach not only effectively increases the competitiveness of MSMEs but also strengthens local socio-economic networks. This model has the potential to be further developed into a national training framework for geoparks and tourist villages in Indonesia, particularly in supporting the downstreaming of technology-based innovation and local wisdom.

Fig 3. Training AI for MSMEs

Participants demonstrated a 60% increase in digital device usage and successfully adopted AI for content creation and social media campaigns. This initiative also created a digital MSME network to support collaboration and innovation. The resulting output includes educational videos, promotional posters, and an online catalog showcasing geopark-based products. The integration of AI and digital literacy transforms MSME learning into a sustainable and future-oriented process. By connecting local storytelling with technological innovation, this approach enhances brand authenticity and resilience. The participatory model serves as an inclusive innovation ecosystem that brings together academia, communities, and local industry

.IV. CONCLUSION

This Community Service (CSP) activity demonstrated that a participatory approach to technology-based training can be an effective strategy for increasing the capacity of MSMEs in the geopark area. Through active participant involvement from the planning stage through evaluation, the program successfully created a collaborative learning environment relevant to local needs. This approach has been proven to increase participants' motivation, confidence, and ability to apply digital technology and artificial

intelligence (AI) to geotourism product marketing activities.The application of speculative design in the training not only developed new technical skills but also fostered creative and imaginative thinking in participants to envision the future of marketing based on local wisdom. This concept helped MSMEs develop authentic geo-branding, connecting their product narratives to the geological and cultural identity of the Pangandaran Geopark area. As a result, participants were able to produce promotional work that was more emotionally and visually powerful and had greater appeal on digital platforms.Integrasi AI dalam proses pelatihan dan promosi juga mempercepat transformasi digital UMKM. The use of AI-based tools such as image generators, caption optimizers, and marketing chatbots provides efficiency in content production and consumer behavior analysis on social media.

Observations indicate that most participants are able to use these technologies independently to increase brand visibility and expand market reach.From a sustainability perspective, the participatory training model implemented in this program creates a long-term impact by establishing a digital community network among business actors. Participants remain connected in online mentoring groups that serve as a space for sharing experiences, innovations, and implementation challenges. This sustainability emphasizes that community-based empowerment and technology can strengthen local socio-economic resilience.Overall, the CSP results demonstrate that the synergy between participatory approaches, speculative design, and the use of AI not only increases the competitiveness of MSMEs but also significantly contributes to the achievement of several sustainable development goals, particularly SDG 8 (Decent Work and Economic Growth), SDG 9 (Innovation and Infrastructure), and SDG 12 (Sustainable Consumption and Production). This model can serve as a blueprint for similar programs in other geoparks in Indonesia that seek to combine technological innovation with the preservation of geocultural values. With the results achieved, this CSP activity is expected to inspire the development of AI-based participatory learning models and geotourism that can be adopted by universities, local governments, and MSME development institutions to strengthen geopark branding nationally and internationally.

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