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Socialization of the Use of Google Gemini to Improve the Quality of Financial Management and Marketing of MSMEs in Indonesia

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ABSTRACT

Indonesia memiliki tingkat kerentanan tinggi terhadap gempa bumi karena posisinya di Cincin Api Pasifik. Kondisi ini menuntut urgensi perencanaan bangunan tahan gempa yang sesuai dengan SNI 1726:2019. Namun, implementasi standar tersebut masih menghadapi kendala berupa rendahnya kompetensi teknis alumni teknik sipil dan pelaku UMKM konstruksi dalam menggunakan perangkat lunak analisis struktur modern. Penelitian ini bertujuan untuk meningkatkan kapasitas teknis dan kewirausahaan peserta melalui pelatihan penggunaan Robot Structural Analysis Professional (RSAP) dan Extended Three-Dimensional Analysis of Building Systems (ETABS) yang dipadukan dengan pembekalan kewirausahaan konstruksi. Penelitian menggunakan pendekatan kuantitatif dalam kerangka pengabdian masyarakat berbasis partisipatif, meliputi tahapan identifikasi kebutuhan, pelatihan berbasis praktik langsung, workshop kewirausahaan, pendampingan intensif, serta evaluasi melalui observasi, kuesioner, dan uji praktik. Pelatihan menghasilkan peningkatan signifikan pada kemampuan peserta, di mana 70% mampu membuat model struktur dan menganalisis beban gempa secara mandiri. Selain itu, tersusun 20 proposal usaha jasa konsultansi, terbentuk 5 unit usaha baru berbasis perencanaan struktur tahan gempa, dan 72% alumni tetap memanfaatkan modul digital hingga tiga bulan setelah pelatihan. Pelatihan software struktur berbasis praktik langsung yang dikombinasikan dengan kewirausahaan terbukti efektif meningkatkan keterampilan teknis dan kemandirian ekonomi peserta. Model ini berpotensi menjadi strategi berkelanjutan dalam mitigasi bencana serta penguatan ekosistem jasa konstruksi berbasis teknologi di Indonesia.

Indonesia has a high level of vulnerability to earthquakes due to its location on the Pacific Ring of Fire. This condition highlights the urgency of earthquake-resistant building planning in accordance with SNI 1726:2019. However, the implementation of this standard remains constrained by the low technical competence of civil engineering graduates and MSME construction actors in operating modern structural analysis software. This study aims to enhance participants' technical and entrepreneurial capacities through training in Robot Structural Analysis Professional (RSAP) and Extended Three-Dimensional Analysis of Building Systems (ETABS), integrated with entrepreneurial development in the construction sector. The research employs a quantitative approach within a participatory community service framework, comprising stages of needs identification, hands-on training, entrepreneurship workshops, intensive mentoring, and evaluation through

observation, questionnaires, and practical tests. The training produced significant improvements in participants' abilities, with 70% successfully creating structural models and independently analyzing seismic loads. Additionally, 20 business consultancy proposals were developed, 5 new structural design enterprises were established, and 72% of alumni continued to utilize digital learning modules up to three months after the training. Practice-based structural software training combined with entrepreneurship has proven effective in enhancing participants' technical skills and economic independence. This model offers a sustainable strategy for disaster mitigation and strengthening the technology-based construction services ecosystem in Indonesia.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are a key pillar of the national economy. However, MSMEs in various regions of Indonesia, particularly in outlying and suburban areas, often face two fundamental internal *bottlenecks* that hinder their growth (Tambunan 2019): 1). Low Quality of Financial Management: Lack of systematic record keeping and difficulty in calculating accurate Cost of Goods Sold (COGS). 2). Ineffective Digital Marketing: Limited creativity and *copywriting skills* in formulating a competitive content strategy. This challenge is particularly pronounced in the five focus locations of the Community Service Program: Buti Village (Merauke, South Papua), Talang Bulu Village (Banyuasin, South Sumatra), Melikan Village (Klaten, Central Java), Bira Village (Makassar, South Sulawesi), and Petuk Katimpun Village (Palangkaraya, Central Kalimantan). This digital divide necessitates efficient and accessible technological interventions.

The emergence of Google Gemini a multi-mode generative AI model offers a highly relevant and accessible solution to address both *bottlenecks* . Gemini is designed to process and generate data, making it a versatile tool for MSMEs (Linda Fatma Audina 2023): 1). Financial Management: Gemini can be asked to create a daily cash report *template in a spreadsheet* or simulate COGS calculations based on given cost inputs (Brynjolfsson & McAfee, 2014). 2). Digital Marketing: Gemini excels at generating creative marketing *campaign ideas, formulating taglines* , and crafting *SEO-friendly* social media *captions* . Gemini's strengths are its ease of access via mobile devices and its integration with the Google ecosystem, making it an effective and cost-effective "virtual management and marketing assistant."

This PkM program is designed to achieve a national scale of impact by implementing intensive socialization for ten days in five locations that represent the geographical diversity and needs of MSMEs: 1). Buti Village (Merauke): Represents the challenges of technology access and focuses on MSMEs processing natural products. 2). Talang Bulu Village (South Sumatra): Focus on culinary and agribusiness MSMEs. 3). Melikan Village (Central Java): Focus on craft MSMEs (Pottery) which require high HPP accuracy and artistic value marketing strategies. 4). Bira Subdistrict (Makassar): Representing suburban service and *e-commerce MSMEs that require fast content strategy* .5). Petuk Katimpun Subdistrict (Palangkaraya): Focus on MSMEs related to non-timber forest products and local tourism.

The main objective of this Community Service Program (PKM) is to: Increase the literacy and competency of MSMEs in five regions of Indonesia in utilizing Google Gemini to improve the quality of financial management and increase the effectiveness of digital marketing. The PkM's contribution is to provide an efficient training model and provide empirical evidence regarding Gemini's potential as a catalyst for MSME digital transformation.

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METHOD

This PkM activity uses *a hands-on* training method and *case-based* mentoring in a *blended* format (virtual and limited face-to-face) which is carried out intensively for ten days in five different locations: Buti Village (Merauke), Talang Bulu Village (South Sumatra), Melikan Village (Central Java), Bira Village (Makassar), and Petuk Katimpun Village (Palangkaraya), involving a total of 150 MSME actors. The main focus is the socialization of Google Gemini for the creation of simple financial report *templates* and digital marketing content strategies. The success of the program is evaluated through measuring competency improvements (Pre-test and Post-test regarding AI-Financial and AI-Marketing literacy) and qualitative analysis of *output* prototypes produced by participants.

RESULT AND DISCUSSION

Result

The results of this Community Service (PkM) implementation were obtained from pre-program and post-program evaluations of 150 MSMEs in five focus locations (Merauke, South Sumatra, Central Java, Makassar, and Palangkaraya) over a 10-day period. The results were broken down based on improvements in AI-Financial and AI-Marketing competencies and the quality of the *output* prototypes
1. Improving AI-Management Literacy (Pre-test and Post-test)

Basic knowledge testing of the Gemini application for Financial Management and Marketing was conducted before and after intensive training. *Paired Sample T-Test* analysis was used to measure the significance of *knowledge gain* .

Table 2. Comparison of Average AI Literacy Scores (100 Scale)

PKM Location	Installment-Installment Pre-test	Rate-Rate Post-test (M)	Increase (%)	t-Statistic	p-value
Merauke (Buti)	40.5	58.1	43.4\%	9.5	<.001
South Sumatra (Talang Bulu)	45.9	63.3	37.9\%	8.8$	<.001
Central Java (Melikan)	51.2	70.5	37.7\%	10.12	<.001
Makassar (Bira)	55.02	75.5	37.3\%	11.20	<.001
Palangkaraya (Petuk Katimpun)	48.5	66.5	37.1\%	8.95	<.001
Combined Average (N=90)	48.2	66.8	38.6%	1.80	<.001

Information: ****p < .01 showed a statistically significant increase.*

The results of Table 1 show that the average AI-Management literacy score at the five locations increased significantly by 38.6\% after training. The highest increase occurred in Merauke, indicating that this technology provided the greatest knowledge leap in a region with initially the lowest AI access and literacy.

2. Functional *Output Prototype Quality*

Qualitative evaluation was conducted on the *output prototypes* produced by participants during *the hands-on practical sessions* with Gemini: 1). Financial Management: a). COGS Improvements and Recording: 80\% Participants were able to use Gemini to generate customized daily cash report *templates and calculate their product's* Cost of Goods Sold (COGS) more accurately. For example, a pottery MSME from Melikan Village successfully integrated previously overlooked equipment depreciation and daily wages, resulting in more realistic selling prices. b). Application in Merauke:

MSMEs in Kampung Buti, Merauke, who have difficulty with accounting terminology, can use Gemini to explain the bookkeeping process in simpler and more visual language (through multimodal features). 2). Digital Marketing: a) Content Creativity: 95\% Participants were able to produce at least two marketing *campaign* prototypes that were deemed more creative and structured than their previous content. For example, a Palangkaraya MSME successfully formulated *a caption* that highlighted the *sustainable* aspects of non-timber forest products. b). Local Adaptation: Participants in Makassar successfully created *a prompt* asking Gemini to create *a tagline* in Makassarese, demonstrating successful adaptation to the local marketing context.3. Adoption Rate and Efficiency: A brief post-PkM survey showed immediate practical impacts90% of participants found Gemini very helpful and plan to use it regularly for administrative work (finance and content). b). Participants reported increased time efficiency in creating simple financial reports and average *copywriting* .40-60\% . c). The main obstacle identified was the stability of internet connections , especially in Merauke and several areas in South Sumatra and Palangkaraya.

Discussion

1. Gemini as a Solution to the Double *Bottleneck for MSMEs*

These findings strongly support the hypothesis that Google Gemini can act as an effective solution to address two major *bottlenecks* for MSMEs: financial management and marketing. The significant increase in AI-Management literacy (Table 1) demonstrates that AI can simultaneously deconstruct administrative complexity (finance) and enhance creativity (marketing), without requiring years of training or expensive software investments: 1). Financial Management: Gemini's ability to generate simple accounting *templates* and assist with calculating COGS is crucial for rural MSMEs. Improving COGS accuracy, as seen in Melikan Village, is a fundamental step in increasing profitability and supporting informed investment decision-making (Tambunan, 2020). 2). Marketing: Using Gemini for *copywriting* and *campaigns* allows MSMEs in outlying areas, such as Petuk Katimpun Village, to produce high-quality content that was previously only available to marketing agencies in large cities. This is key to expanding digital market share .

2. Inclusive Impact of AI: Addressing the Access Gap in Merauke

The highest increase recorded in Merauke (Buti Village) was 43.4% is a key indicator of the success of an inclusive Community Service (PKM) program. Regions with the highest challenges in access and digital literacy actually benefit the most from *knowledge gains*. This underscores Gemini's role as a digital equity tool . Its intuitive *user interface* and multilingual capabilities make it an ideal model for outreach in 3T (Frontier, Outermost, and Disadvantaged) regions.

3. National Scale Implementation and Local Adaptation

The success of PkM in five geographically and culturally diverse locations (from Papua to Java) demonstrates the training module's high scalability and flexibility for local adaptation . For example, the success of Gemini in using local languages and adapting local products demonstrates that AI can be integrated with *glocalization* strategies. However, the discussion must acknowledge the infrastructure limitations identified in several locations (Merauke, Palangkaraya). While *skills* have improved, the daily implementation and sustainability of the PkM program are highly dependent on improved internet connectivity. If internet access is unstable, the time efficiencies promised by Gemini cannot be realized.

CONCLUSION

Based on the results of the pre-test and post-test analysis as well as qualitative evaluation of the output prototypes (financial reports and marketing content) from 150 MSME actors in five PkM locations (Merauke, South Sumatra, Central Java, Makassar, and Palangkaraya), this activity reached the following substantive conclusions:

1. Effectiveness of Functional Competency Improvement: The Google Gemini outreach program has proven highly effective and statistically significant in improving AI-Management literacy in MSMEs. The average competency score increased by$\approx 38.6\%$, which proves that Gemini is an accessible and easy-to-learn tool for overcoming administrative and creative bottlenecks.
2. MSMEs' Double Bottleneck Solution : Gemini succeeds in being a functional solution to two fundamental MSME problems simultaneously: 1). Financial Management: Participants will be able to use Gemini to create a more structured daily cash report template and calculate COGS

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(Cost of Goods Sold) accurately, which is the foundation for operational efficiency. 2). Digital Marketing: Participants produce more professional, creative, and locally adaptive copywriting and campaign prototypes , unlocking real potential for increased competitiveness and market share.

3. Inclusive Impact and Scalability: The even and significant increase across the five diverse regions demonstrates that Gemini serves as a highly scalable digital equalization tool for implementation across MSMEs across Indonesia, including in areas with the highest access challenges (Merauke).

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