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# Fostering Village Prosperity: Digital Innovations in Service Information and Uplifting UMKM Marketing Transforming Desa Balongdowo in Indonesia

Triwiyanto<sup>1</sup>, Sari Luthfiah<sup>2</sup>, Bedjo Utomo<sup>1</sup>, and Torib Hamzah<sup>1</sup>

<sup>1</sup>Department of Electro-medical Engineering, Health Polytechnic Minister of Health of Surabaya, Surabaya, Indonesia

<sup>2</sup>Department of Nursing, Health Polytechnic Minister of Health of Surabaya, Surabaya, Indonesia

**Corresponding author:** Sari Luthfiah (e-mail: [sarilut@poltekkesdepkes-sby.ac.id](mailto:sarilut@poltekkesdepkes-sby.ac.id))

**ABSTRACT** The rapid advancement of digital technology has transformed traditional economic and administrative systems, yet many rural areas in Indonesia still struggle to adapt to this shift. Balongdowo Village, known for its seafood-based micro, small, and medium enterprises (MSMEs), faces significant challenges in product marketing and community information management due to limited digital literacy and the absence of a village information portal. This study aimed to empower Balongdowo Village through digital innovation by developing a website-based Village Service Information System (SIPD) and enhancing MSME marketing through e-commerce platforms. The community service project employed a participatory approach involving Forum Group Discussions (FGDs), digital marketing seminars, hands-on workshops, and mentoring sessions conducted from May to October 2023. The training introduced digital marketing strategies, multimedia content creation, and certification processes for local products, followed by technical assistance in creating and managing the village website. The implementation resulted in the successful development of the official Balongdowo Village website, providing accessible and transparent village information. Furthermore, more than 80% of participating MSME owners successfully created online stores on platforms such as Tokopedia, Shopee, and Blibli, which expanded their market reach and increased product visibility. The initiative also improved the capacity of local digital teams and village operators in managing information systems and marketing content. In conclusion, this program demonstrated that integrating digital marketing with a web-based village information system effectively enhances economic resilience, transparency, and community engagement. Future initiatives should focus on continuous digital literacy training, infrastructure enhancement, and long-term monitoring to sustain the digital transformation of rural communities.

**INDEX TERMS** Digital marketing, Service Information System (SIPD), Balongdowo Website Portal, community development, rural digital transformation.

## I. INTRODUCTION

The acceleration of digital transformation has reshaped economic, social, and administrative activities worldwide, creating both opportunities and challenges for rural communities [1]. In Indonesia, where a large portion of the population resides in villages, digital inequality remains a major issue, leading to gaps in access to information, services, and economic participation [2]. Despite significant progress in urban digitalization, many villages still depend on manual systems for administration and traditional methods for local business marketing [3]. Balongdowo Village in Sidoarjo Regency exemplifies this condition local micro, small, and medium enterprises (MSMEs) rely heavily on conventional marketing channels, and village service information is distributed through non-digital means [4]. These limitations have hindered transparency, slowed public service delivery, and constrained the growth potential of local entrepreneurs.

Although the Indonesian government has promoted several digital initiatives such as *Smart Village* and *Digital*

*Economy 4.0*, implementation in rural areas has faced persistent obstacles, including limited infrastructure, low digital literacy, and the absence of sustainable digital governance frameworks [5]. Many MSME owners lack adequate understanding of online marketing strategies, while village administrators often struggle with managing digital information systems [6]. Consequently, digital transformation at the village level remains fragmented, reducing both the efficiency of public administration and the competitiveness of local economic actors [7].

Prior studies highlight that digital empowerment programs and web-based information systems have proven effective in improving transparency, public engagement, and business sustainability [8]. Web-based village information systems are capable of streamlining administrative processes, increasing accountability, and strengthening local governance [9]. In parallel, the integration of digital marketing and e-commerce has demonstrated its potential to expand MSME market reach, especially in rural communities [10]. Recent models that

combine information systems with digital business literacy training have successfully improved both administrative efficiency and local economic resilience [11]. For example, studies by Pratama and Dewi (2022) and Sari and Taufik (2021) showed that combining e-commerce education with web-based systems can accelerate rural economic development through participatory engagement [12], [13]. However, despite these advancements, most initiatives remain project-based, lack community involvement, and fail to establish long-term continuity [14].

While prior programs have focused separately on either digital governance or MSME training, few have explored the integration of both within a unified, community-centered empowerment framework. Additionally, there is limited empirical evidence assessing the impact of digital integration on village transparency, economic performance, and community participation. Therefore, a holistic and participatory digital empowerment model is required to strengthen both governance and economic resilience in rural Indonesia [15].

This study aims to foster digital transformation in Balongdowo Village through the creation of a web-based Village Service Information System (SIPD) and the enhancement of MSME digital marketing capacity. The initiative is designed to improve transparency in public services, expand the market accessibility of local products, and enhance community digital literacy. This study contributes in three main ways:

1. It introduces a participatory digital empowerment model combining governance and entrepreneurship components for sustainable rural development.
2. It demonstrates the practical outcomes of implementing a web-based SIPD integrated with MSME digital marketing strategies.
3. It provides a replicable framework for other rural communities to support Indonesia's *Smart Village* and digital economy initiatives.

The remainder of this paper is structured as follows: Section II details the methodology, including the participatory approach, digital training process, and website development. Section III presents the key findings related to system implementation and MSME outcomes. Section IV discusses the implications of the program in the broader context of rural digital transformation. Finally, Section V concludes the paper and provides recommendations for future sustainability and scalability.

## II. METHOD

This study applied a community-based participatory approach within a quasi-experimental framework to assess the effectiveness of digital empowerment initiatives in fostering economic and administrative development in Balongdowo Village. The program integrated two primary interventions: the creation of a web-based Village Service Information System (SIPD) and the enhancement of MSME digital marketing capacity. This design allowed for systematic evaluation of changes in digital competence, administrative efficiency, and business visibility among participants before and after the intervention [16].

## A. STUDY DESIGN AND RASIONALE

The study utilized a one-group pretest–posttest design to evaluate the direct impact of digital literacy training and information system implementation. This design was chosen to examine within-group changes without the inclusion of a control group, which is appropriate for community-based settings with limited sample size and resources [17]. The participatory approach enabled active engagement of local stakeholders village administrators, MSME owners, and digital facilitators ensuring contextual relevance and sustainability of the intervention [18]. The framework followed four key phases: assessment, capacity building, implementation, and evaluation.

## B. STUDY SETTING

The research was conducted in Balongdowo Village, Candi District, Sidoarjo Regency, East Java. The location was strategically selected due to its high concentration of seafood-based MSMEs and the absence of an integrated digital system for administration and marketing. Data collection and intervention activities were conducted from May to October 2023, encompassing preparatory coordination, website development, training workshops, mentoring sessions, and evaluation. The program was carried out in collaboration with local officials and supported by community volunteers [19].

## C. PARTICIPANTS AND SAMPLING METHOD

Participants consisted of 30 individuals, including 10 village administrative staff and 20 MSME owners actively engaged in seafood product production and sales. Inclusion criteria required participants to be residents of Balongdowo Village, aged 20–55 years, actively involved in MSME operations or administrative duties, and willing to participate throughout the training process. Exclusion criteria included participants who were unable to attend the full training schedule or lacked basic technological access (e.g., smartphone or internet). The sampling technique used was purposive sampling, selected to ensure representation across both administrative and entrepreneurial sectors of the village [20]. This approach enabled direct evaluation of the intervention's effects on different functional groups while minimizing sampling bias.

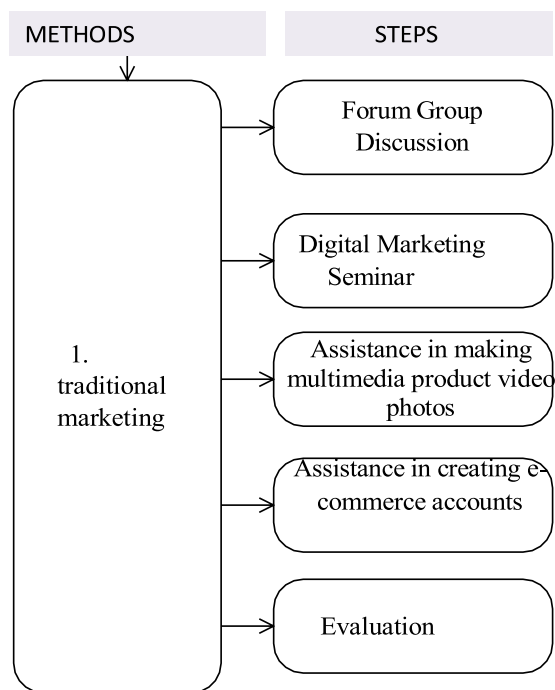
## D. MATERIALS AND DIGITAL EMPOWERMENT INTERVENTION

The implementation of Community Service activities was carried out as many as 2 different activities but interconnected with each other, namely through the creation of a village service information system and the development of UMKM marketing through digital carried out in parallel.

### 1. STAGE 1: MARKETING FIELD

Starting from organising a Forum Group Discussion (FGD) with home industry players, MSMEs and cadres to capture the problems and initial understanding of the Balongdowo Village community related to e-commerce. FGDs on digital marketing are a very useful platform to promote knowledge, exchange of ideas, and collaboration between digital marketing professionals, thus enabling FGD Participants to

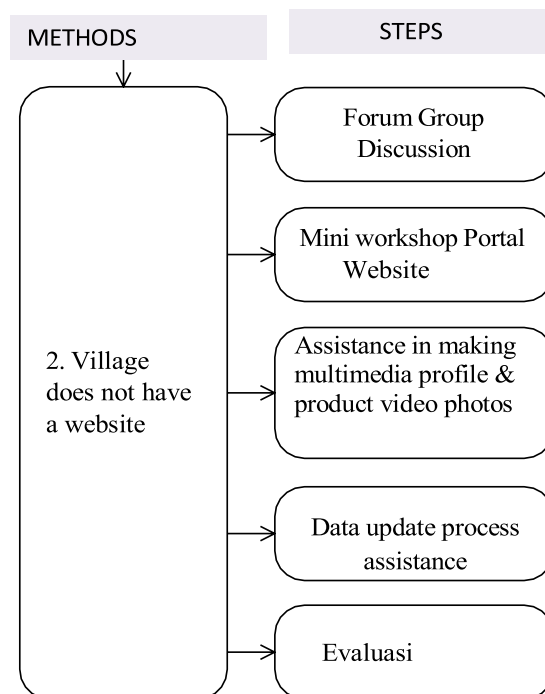
stay informed on the latest developments in the industry[21]. The outcome of this FGD was a discussion of the latest trends and developments in digital marketing, such as the adoption of new technologies, or shifts in consumer behaviour. Also gained as a result of the discussion were effective Digital Marketing strategies, including the utilisation of social media[22]. The next step is to prepare materials and organise e-commerce-based digital marketing training to increase sales of Balongdowo village products. In this case inviting experts who can explain the importance of digital marketing, and also the provisions that must be adhered to by market players, including halal certification, the existence of PIRT certification.



**FIGURE 1.** Method of implementation of community service activities

So that experts were also invited in the management of Halal and PIRT Certification from the Sidoarjo Health Office. Followed by the implementation of assistance with PPDM members and students in producing multimedia documents (photos and videos) of processed products that can attract consumers. Presentations were given on procedures for submitting proposals for Halal certification and PIRT Certification. And also, presentations in digital marketing with material Digital marketing includes various strategies to promote products, services or brands using digital platforms and media. Here are some things that are generally conveyed in digital marketing regarding the creation, dissemination, and promotion of relevant, informative, and interesting content to attract audience attention[23]. Types of content include blogs, videos, infographics, podcasts, and others. And also, the use of Social Media Marketing where businesses can promote products or services through social media platforms such as Facebook, Instagram, Twitter, LinkedIn, and others. As

well as in managing and publishing content in accordance with the characteristics and needs of the audience on each platform. In this activity, the manager of the online marketing business from Bibli was also invited. Furthermore, assistance was provided to partners by the pengabmas team for the account registration process, uploading products, and handling the sales process in several e-commerce. The last step is to evaluate the buying and selling process in e-commerce during the PPDM activity period together with partners, lecturers and students to see the independence of residents in developing digital marketing.



**FIGURE 2.** Method of implementation of community service activities.

## 2. STAGE 2: INFORMATION SYSTEMS FIELD

Organising a Forum Group Discussion (FGD) with home industry players, MSMEs and village officials to capture the problems and initial understanding of the Balongdowo Village community related to the importance of village profiles to introduce the potential of the village to the outside community (national and international). Followed by preparing materials and organising a mini workshop on the operation of the Balongdowo Village Website Portal based on Wordpress CMS for operators at Balongdowo Village Hall. The next step is to provide assistance with PPDM members and students in producing multimedia documents (photos and videos) to develop village information systems including profiles, processed products, and village activities. The next step was to provide assistance to partners by the community service team for the upload process on the alongdowo village website portal. The process of evaluating the development of the information system portal during the PPDM activity period and after the activity together with partners, lecturers and

students to see the independence of residents in developing village information systems.

This community service activity was carried out from May to October 2023 in Balongdowo Village, Candi District, Sidoarjo Regency. The partner of this activity is Balongdowo Village which includes the Village Head, Village IT staff, business people and all Balongdowo Village Community to participate in this activity. Partners participated in determining participants and facilitating the venue.

### E. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data collection was conducted through mixed-methods instruments, combining quantitative questionnaires and qualitative observations. The questionnaire measured knowledge improvement, digital literacy, and satisfaction levels using a five-point Likert scale. Pretest data were collected before training sessions, while posttest data were gathered one week after completion to capture immediate changes. Qualitative data, including participant feedback and observational notes, were used to complement quantitative findings and understand behavioral adjustments. All data collection sessions were supervised by trained facilitators to ensure consistency, reliability, and accessibility for all participants [24].

### F. DATA ANALYSIS

Quantitative data were processed using SPSS version 26.0. Descriptive statistics were used to present participant demographics, training attendance, and score distributions. The Wilcoxon signed-rank test was applied to evaluate significant differences between pretest and posttest results, as data were non-parametric and based on paired observations. A  $p$ -value  $< 0.05$  was considered statistically significant. Qualitative data were analyzed thematically to identify recurring patterns related to digital skill enhancement, motivation, and perceived usefulness of the interventions. The integration of both data types strengthened validity through triangulation, ensuring a comprehensive understanding of program outcomes [25].

### G. ETHICAL CONSIDERATIONS

The study adhered to ethical principles for community-based research. Prior to implementation, approval was obtained from the Institutional Ethics Committee of Poltekkes Kemenkes Surabaya (Approval No. 045/Polkes/2023). Written informed consent was obtained from all participants, ensuring voluntary participation and confidentiality of responses. Participants were informed about the objectives, potential benefits, and the right to withdraw without penalty. Data were anonymized and stored securely to protect privacy and integrity.

## III. RESULT

The implementation of Community Service was carried out in the hall of Balongdowo Village Hall, Candi District, Sidoarjo Regency, East Java. The implementation of Community Service activities is carried out as many as 2

different activities but are interconnected with each other, namely through the creation of a village service information system and the development of UMKM marketing through digital carried out in parallel.

### 1. MARKETING FIELD

Starting from holding a Forum Group Discussion (FGD) on 25 April 2023 with home industry players, MSMEs and cadres to capture the problems and initial understanding of the Balongdowo Village community related to e-commerce. FGD on digital marketing is a very useful platform to promote knowledge, exchange of ideas, and collaboration between digital marketing professionals, thus allowing FGD Participants to stay informed about the latest developments in the industry. The outcome of this FGD was a discussion of the latest trends and developments in digital marketing, such as the adoption of new technologies, or shifts in consumer behaviour. Also obtained as a result of the discussion were effective Digital Marketing strategies, including the utilisation of social media. The FGD activities were documented in the form of meeting minutes.



**FIGURE 3.** Some Participants of the Forum Group Discussion of Community Service activities in Balongdowo Village

The next step is to prepare materials and organise e-commerce-based digital marketing training to increase sales of Balongdowo village products. In this case, we invited experts who could explain the importance of digital marketing, and also the provisions that must be adhered to by market players, including halal certification, the existence of PIRT certification. So that experts are also invited in the management of the steps taken are to determine the date, time, and place of training. Followed by submitting a request to the resource person. It is in accordance with the availability of the invited experts, and the material that will be taught to the participants. This should include the importance of digital marketing and the provisions that must be adhered to by market players, such as halal certification and PIRT certification.

The Community Service Team ensures that the FGD participants have relevant materials and can explain comprehensively about the importance of digital marketing and the provisions that must be adhered to. Cooperation



with Sidoarjo Health Office: to invite experts in Halal management and PIRT Certification, and the expert can provide relevant and useful information for the training participants. They created promotional materials for the training, including posters, brochures, and online announcements. Open registration for Balongdowo villagers and business owners who want to join the training before the training day. After the training, the experts and speakers have access to the FGD participants to measure the success of the training and to gather feedback from participants. After the training, there is good documentation of the event, including the notes provided in the training to all participants. After the training, it is expected that business actors will stay in touch with the invited resource persons to answer questions and provide additional support if needed.

On 16 May 2023, assistance was provided with PPDM members and students in producing multimedia documents (photos and videos) of processed products that can attract consumers. Presentations were given on procedures for submitting proposals for Halal certification and PIRT Certification. And also, presentations in digital marketing with material Digital marketing includes various strategies to promote products, services or brands using digital platforms and media.



**FIGURE 4.** The opening of the Digital Marketing seminar and workshop at the PKK Room in Balongdowo Village, Sidoarjo.

Here are some things that are generally conveyed in digital marketing regarding the creation, dissemination, and promotion of relevant, informative, and interesting content to attract audience attention. Types of content include facebook, blogs, videos, infographics, podcasts, and others. And also, the use of Social Media Marketing where businesses can promote products or services through social media platforms such as Facebook, Instagram, Twitter, LinkedIn, and others. As well as also in managing and publishing content in accordance with the characteristics the needs of the audience on each platform. Assistance to partners by the pengabmas team for the account registration process, uploading in this activity, the manager of the online marketing business from Blibli was also invited.



**FIGURE 5.** Implementation of Digital Marketing seminars and workshops in the PKK Room Balongdowo Village, Sidoarjo



**FIGURE 6.** Delivery of material from Blibli digital marketing resource persons, and handling the sales process in several e-commerce

Seminar and workshop activities provide the best opportunity for participants to be actively involved in the process of making photos and videos of processed products. FGD participants were given guidance and practical training on photography and videography techniques. The resulting multimedia documents are expected to be able to promote processed products well and attract consumers' attention. In this activity, a presentation was also held on the process of submitting proposals for Halal Certification and PIRT Certification regarding the procedures for submitting proposals for Halal certification and PIRT Certification. Participants get an in-depth understanding of the requirements and process of applying for certification required for processed products. In the Digital Marketing presentation session, participants were taught about digital marketing, including strategies and to promote products and services through digital platforms and media. The speakers explained the importance of relevant, informative, and engaging content in digital marketing, as well as the types of content that can be used such as facebook, blogs, videos, infographics, and others. Participants were also taught about the utilisation of Social Media Marketing, which is how

businesses can promote products or services through social media platforms such as Facebook, Instagram, Twitter, LinkedIn, and others. Another resource person, an online marketing business manager from Blibli, provided insight into the experience and best practices in managing and publishing content that is in accordance with the characteristics and needs of the audience on each platform. This activity was very useful and provided valuable insights to participants in terms of product development, certification, and digital marketing[16]. Participants are expected to apply the knowledge gained in supporting the development of processed products in Balongdowo Village. The documentation of the activity is at the following link: <https://urlis.net/fotopengabPPDM>



FIGURE 7. Presentation of material from the Sidoarjo Health Office at the Digital Marketing seminar and workshop.

In the evaluation stage, the buying and selling process in e-commerce is carried out during the PPDM activity period together with partners, lecturers and students to see the independence of residents in developing digital marketing.



FIGURE 8. Submission of material from the Halal Certification Team



FIGURE 9. Halal certificates produced after seminar and workshop activities



FIGURE 10. Picture of mikro-based business licence certificate (known: NIB)



FIGURE 11. An online account in TOKOPEDIA e-commerce that can be registered

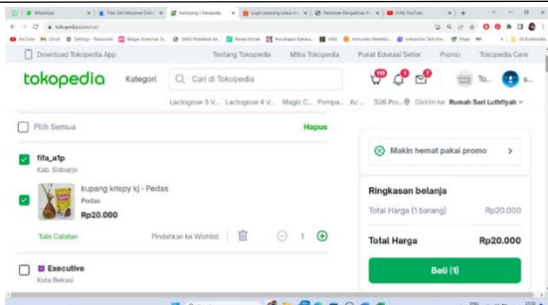


FIGURE 12. Picture of the online account shopping process that can be registered online accounts

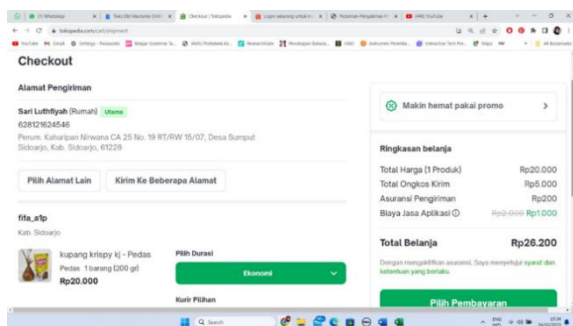


FIGURE 13. Picture of shopping check out process

## 2. THE INFORMATION SYSTEM FIELD

The implementation of this Community Service was carried out through several steps, such as Licensing, Problem Survey, Socialisation of work programs, Process of Website Development and Village Administration and Information Systems, and Village Operator Training.

### a. Explaining and asking for permission

This is the main stage in Community Service activities carried out in order to obtain permission to carry out activities in Balongdowo Village, especially from the This is done so that important formulations related to the digitalisation of village information can be carried out optimally.

The method used is a direct discussion between the Community Service Team in Balongdowo Village and the parties involved, such as the Lurah and kelurahan staff, and the general village community.

### b. Problem Survey

A problem survey was conducted to find the core problems surrounding digitalisation in Balongdowo Village. This activity was conducted through an interview method with the Village Head and Village Apparatus. Based on the method, several fundamental problems were found in the context of digitalisation, such as:

- 1) Inaccessibility of Balongdowo village website
- 2) The absence of a digital platform that provides access to information about Balongdowo.
- 3) The use of conventional methods in storing village government data

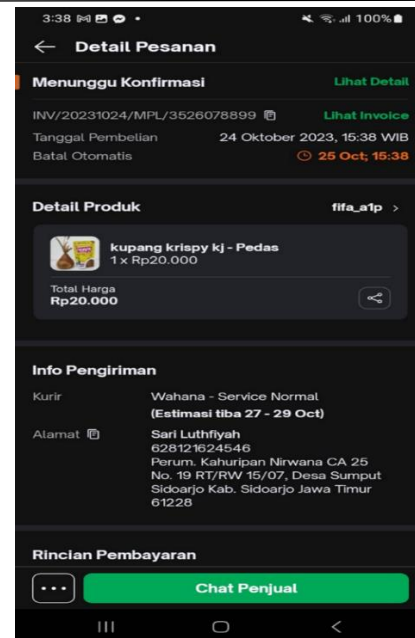


FIGURE 14. Picture of shopping check out process

After obtaining the problems surrounding digitalisation, the Balongdowo Village Community Service Team designed in detail the implementation of the program. The creation of a Forum Group Discussion (FGD) was carried out through a discussion method between the Balongdowo Village Community Service Team. Through these discussions, the Digital Village Program was created as a solution to the problem of digitalisation in Balongdowo Village. Later, the main actors of the Digital Village will be directed to village officials, especially in the village operator section. Some of the key activities of this programme include integrating population census data, road maps, and village profiles into a digital platform, and training village officials for programmed sustainability.



FIGURE 15. Photo with Lurah Balongdowo after explaining and asking for permission to create a Desa Balongdowo website.



### C. WEBSITE DEVELOPMENT PROCESS AND VILLAGE ADMINISTRATION AND INFORMATION SYSTEM

The next stage of the Digital Village work programmed is the creation of the Village Website and information system. Both platforms have different functions and levels of information confidentiality. The village website is a platform that can contain a collection of village information in the form of text, images, sound, or video. The information can range from village profiles to entrepreneurial potential. However, the easy access to this platform that can be done by the entire community makes certain information such as the NIK data of residents cannot be entered due to data confidentiality. Meanwhile, service information system is a platform to manage, analyse, and present village data and information based on information technology. It contains specific data on villagers, such as members per family, the NIK of all family members, data on recipients of government assistance, and so on. Therefore, the level of confidentiality of information in service information system is relatively high and access to this platform is also limited to village officials only.

### D. DESA BALONGDOWO WEBSITE OPERATOR TRAINING

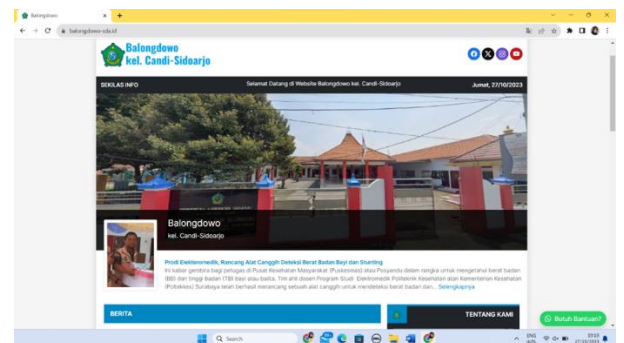
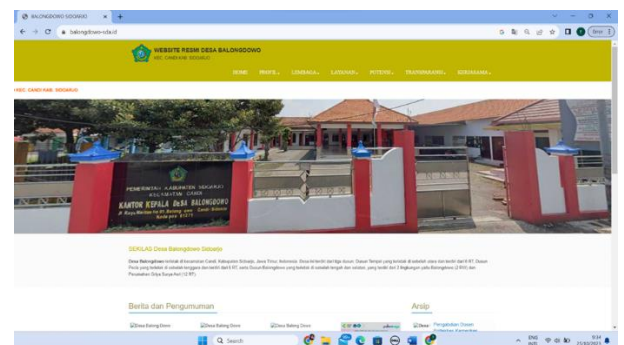
At this stage, the Community Service Team provides teaching or socialisation to village officials (Village operators) in the management of the latest village website that has been created by us, where the socialisation of village website management aims to make village officials more advanced, considering that this Balongdowo village where the officials themselves have very little knowledge in information especially related to technology issues. The enthusiasm of Balongdowo village operators themselves tends to be high, where they hope to use the website so that Balongdowo village itself can be more advanced and can be seen transparently by Balongdowo village residents themselves especially and for the entire community.

The training was conducted using the online method at one of the village officials' residences. Some of the things that were explained in this stage were about

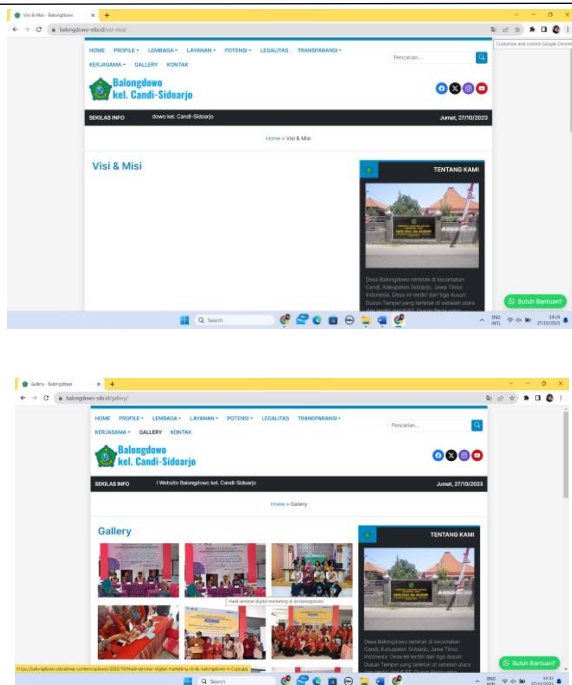
- Login steps to the website and service information system platform of Balongdowo Village.
- Mechanisms for editing the Balongdowo Village website 2.
- Mechanisms for using the Balongdowo Village website and informatic system.



FIGURE 16. Desa Balongdowo website operator training.







**FIGURE 16.** View of the Desa Balongdowo website portal

Evaluate the development of the information system portal during and after the PPDM activities together with partners, lecturers and students to see the independence of the community in developing the village information system[20]. This evaluation should be a tool to enable the development of a more effective village information system portal and increase community independence in the use of information technology. It can also help assess the positive impact of the PPDM programme on the overall development of the village. After the trial use of the Balongdowo village website portal, the PPDM team and the Balongdowo village website operators discussed the findings, identifying the achievements and challenges faced by the villagers in developing the village information system. The Pengabmas team also provided recommendations and suggestions for improvements based on the evaluation results, making recommendations for improvements if needed. This could include suggestions for further training or additional support to the website operators. Here we also receive feedback to the villagers on the evaluation results, provide explanations of achievements and provide encouragement to continue to improve self-reliance in the development of the village information system.

#### IV. DISCUSSION

The implementation of the community service program in Balongdowo Village through two integrated interventions the development of a web-based Village Service Information System (SIPD) and the empowerment of micro, small, and medium enterprises (MSMEs) in digital marketing produced substantial improvements in administrative performance, digital literacy, and economic visibility. The findings indicate

that both village administrators and MSME participants demonstrated enhanced competencies in using digital tools for service delivery and business promotion. Prior to the intervention, most administrative communication and marketing activities were conducted manually, which limited efficiency, transparency, and outreach. After implementing the SIPD and conducting digital marketing training, the community achieved more timely public communication, simplified service processes, and broader market access for local products. These outcomes emphasize that digital empowerment if implemented through participatory and context-sensitive methods can serve as a strategic instrument for advancing rural development.

The improvement in administrative transparency following the establishment of SIPD aligns with the findings of Iskandar et al. [26], who reported that web-based village information systems enhance data accessibility, accountability, and responsiveness in public governance. In Balongdowo Village, information regarding population records, service schedules, and development programs could be accessed online, reducing the dependency on physical documentation and meetings. This transition not only improved workflow efficiency but also strengthened community trust in local governance. Moreover, the system enabled administrators to collect and store data systematically, promoting evidence-based decision-making. Such integration between digital systems and village operations reflects an important milestone in the digital transformation of rural governance.

The digital marketing empowerment program for MSMEs demonstrated a significant contribution to economic growth at the local level. After training, more than 80% of participants successfully created online stores through platforms such as Shopee, Tokopedia, and Blibli. They also gained practical skills in digital photography, social media advertising, and online customer interaction. These findings are consistent with Handayani and Widodo [27], who showed that MSME digitalization directly improves sales performance and competitiveness, particularly in post-pandemic contexts where online engagement is vital. The success of the Balongdowo initiative also mirrors the results of Lee and Park [28], who found that small enterprises adopting e-commerce platforms achieved higher customer retention and adaptability in fluctuating markets. The parallel implementation of governance digitalization and economic empowerment distinguishes this study from earlier single-focus interventions, reinforcing that sustainable digital transformation requires a multidimensional approach.

In addition to skill acquisition, the participatory training design strengthened social interaction and collective ownership of the program. Participants reported increased motivation to apply digital tools in their routine activities. This aligns with the argument of Rahayu et al. [29], who emphasized that participatory digital literacy initiatives foster behavioral change and long-term engagement by promoting learning through collaboration and peer support. The Balongdowo case demonstrated that co-creation between

facilitators, MSME actors, and administrators ensured contextual relevance of training materials and system design. By using locally relevant examples such as seafood product branding, online packaging tutorials, and local service documentation the program maintained cultural alignment while introducing modern technological skills. This localized strategy increased participant retention and improved knowledge transfer outcomes.

However, despite the program's overall success, several limitations must be acknowledged. The absence of a control group restricts the ability to attribute the observed improvements solely to the intervention. External influences, such as nationwide digital campaigns and expanding internet accessibility, may have contributed to knowledge gains. This limitation is common in community-based studies where experimental control is difficult to implement [30]. Furthermore, the study duration of six months was relatively short, limiting the assessment of long-term sustainability and post-intervention digital engagement. Follow-up studies with extended monitoring periods are needed to evaluate system maintenance, digital usage frequency, and the continuity of MSME online marketing performance. Another challenge encountered during implementation was infrastructure instability specifically inconsistent internet connectivity which hindered the real-time functionality of SIPD and online business transactions. Addressing such technical barriers requires collaboration between local governments and telecommunications providers to improve rural network coverage.

From a methodological standpoint, the reliance on self-assessment questionnaires may introduce response bias, as participants could overreport perceived improvements. Future research should incorporate more objective performance indicators such as website traffic, transaction counts, and user analytics to validate program effectiveness. Nonetheless, the consistent feedback from participants and direct observation of their post-training activities support the credibility of the reported outcomes. Moreover, the qualitative component of the study captured the transformative impact of the intervention on participants' confidence, autonomy, and sense of belonging within the digital ecosystem.

The implications of these findings are multifold. Firstly, the success of the dual-intervention model highlights the potential for replication across other rural communities. By integrating administrative modernization with entrepreneurship development, local governments can achieve both transparency and economic inclusivity. Secondly, the participatory approach used in Balongdowo reinforces the principle that technology adoption should be community-driven rather than externally imposed. Engaging local actors throughout system development and implementation ensures that digital innovations remain relevant and sustainable. Thirdly, this model contributes to the realization of Indonesia's *Smart Village* initiative by demonstrating a practical framework for bridging the digital divide at the grassroots level. It provides empirical evidence

that digital transformation can promote equitable growth when supported by local collaboration, capacity building, and consistent monitoring.

Finally, the Balongdowo experience offers valuable insights for policy and educational practice. Policymakers should prioritize investment in digital infrastructure and allocate dedicated funding for continuous training and technical support. Simultaneously, academic institutions can integrate community-based digital projects into their service-learning programs to bridge the gap between higher education and societal needs. Such collaborative models can create a sustainable ecosystem of innovation, where local knowledge and academic expertise jointly contribute to digital resilience. In conclusion, this study confirms that integrating village information systems with MSME digital empowerment can foster transparency, accountability, and economic vitality in rural settings. While further research is needed to assess long-term sustainability, the Balongdowo model provides a scalable blueprint for future rural digital transformation initiatives across Indonesia.

## V. CONCLUSION

The purpose of this Community Service activity is to increase the sustainability of MSME and home industry businesses in Balongdowo Village, and market products on e-commerce platforms, and aims to increase public understanding and knowledge of the profile and potential of Balongdowo village through the village information system portal (website), introducing village potentials to outside communities (national and international). The result of this PPDM scheme Community Service is that the online shop of Balongdowo Village residents has been produced in various e-commerce: namely Blibli and Tokopedia. As well as the successful availability of the Desa Balongdowo website which contains many features of community service information features in the village, information about potential places and can be developed together. The presence of the Digital Village pilot requires the full support of all Balongdowo Village managers, staff and personnel in the village. There are several challenges that will be faced in the future to maintain the pilot, namely the implementation of Digital Village and digital marketing in Balongdowo Village or similar villages are often faced with a number of obstacles that need to be overcome. Some of the key barriers that may be faced include limited Internet access, limited Digital Skills in digital understanding and skills, low awareness of the benefits of digital. Strategic steps in overcoming these challenges include improving technology infrastructure and regular training for medical personnel, optimising budget allocations, and extension campaigns to increase community awareness and acceptance.

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## DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

## AUTHOR CONTRIBUTION

Triwiyanto conceptualized and designed the study, supervised the overall implementation of community service activities, and guided the development of the research framework. Sari Luthfiyah coordinated field implementation, conducted data collection, and led the analysis and interpretation of results. Bedjo Utomo contributed to the technical development of the Village Service Information System (SIPD), facilitated digital training sessions, and participated in manuscript drafting and revisions. Torib Hamzah supported the digital marketing empowerment program for MSMEs, managed stakeholder collaboration, and assisted in preparing and editing the final manuscript. All authors reviewed and approved the final version of the paper and agreed to be responsible for all aspects of the work to ensure its integrity and accuracy.

## DECLARATIONS

### ETHICAL APPROVAL

This study was conducted by ethical standards and has received approval from the Institutional Review Board (IRB) of Poltekkes Kemenkes Surabaya, Indonesia, with approval number [045/Polkes/2023]. All participants, including village officials and MSME owners, were informed about the objectives, procedures, and voluntary nature of their participation. Informed consent was obtained prior to data collection and digital training implementation. Confidentiality, privacy, and data protection were strictly maintained throughout the study, and all procedures adhered to institutional and national ethical guidelines for research involving human participants.

### CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants

### COMPETING INTERESTS

The authors declare no competing interests

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