

MAPPING IDEA & LITERATURE FORMAT | RESEARCH ARTICLE

Digital Content Implementation as a Transformation of Digital Marketing Strategy for Computer Service MSMEs: A Community Service Program for Alify MSME in Pananjung Village, Pangandaran, West Java

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ARTICLE HISTORY

Received: July 08, 2026

Revised: July 20, 2026

Accepted: July 31, 2026

DOI

<https://doi.org/10.52970/grmilf.v6i3.2502>

ABSTRACT

Digital technology has transformed MSME marketing, yet many Indonesian micro-enterprises still rely on conventional promotion. This Community Service Program implemented digital content creation to strengthen Alify MSME's marketing strategy in Pananjung Village, Pangandaran, using an Appropriate Technology approach integrated with Participatory Action Research. Activities included a pre-survey of 30 customers, needs assessment, content design, practical training, mentoring, and post-evaluation. The validated instrument measured digital brand awareness, content quality, promotional affordability, and customer interaction satisfaction. The average score increased from 1.87 to 4.12, with a 120.3% improvement, an N-Gain of 0.75, and significant paired t-test results across all dimensions. Alify also independently managed two social media accounts, gained 127 followers, achieved 4.8% engagement, and produced a practical digital marketing guide sustainably.

Keywords: Digital Content, MSMEs, Marketing Transformation, Digital Marketing, Appropriate Technology.

I. Introduction

Pananjung Village, Pangandaran District, Pangandaran Regency, West Java, is one of the areas with economic activities that continue to grow, driven by the tourism, education, and service business sectors. As a well-known beach tourism area, Pangandaran attracts millions of tourists every year and triggers the growth of various supporting businesses, including the increasing need for information technology devices such as computers and laptops both for business administration, learning, and digital promotion purposes. This condition directly creates a large market opportunity for computer service businesses in the region. Demographically, the population of Pananjung Village is dominated by micro business actors, traders, and service providers, most of whom have begun to utilize information technology in their daily activities, but have not been balanced with adequate digital management capacity especially in the aspects of marketing and business promotion. Alify MSMEs is a micro business engaged in computer and laptop service services located on Jl. Station No. 22 Karang Salam, Pananjung, Kec. The business, which is managed by Mrs. Lala Komalasari, provides a variety of services, including hardware repair, software installation, computer network services, document typing and printing, banner design, and sales of computer accessories. The business location near Pangandaran Station and the central area of community activity makes Alify MSMEs have a strategic position with a fairly wide potential

customer reach, including students, students, local business actors, village officials, and tourists who need information technology services. Even though it has been operating for quite a long time and has a fixed customer base, the growth of Alify's MSME business tends to be stagnant due to the limited range of promotions used. The available resources including computer devices, smartphones, and internet connections are actually sufficient capital to start leveraging digital marketing, but this potential has not been optimized.

The priority problem faced by Alify MSMEs is centered on the lack of integration of digital marketing strategies in business operations. Promotions carried out so far still rely entirely on conventional methods in the form of word-of-mouth recommendations and physical signage in front of the store. Alify MSMEs do not have an active business social media account, have never produced digital content for promotion, and do not have a consistent visual brand identity in the digital realm. The results of the initial identification through field observation and Focus Group Discussion (FGD) with business owners in February 2026 showed that 73.3% of 30 respondents (customers and potential customers) only knew about the existence of Alify MSMEs from the recommendations of the closest people, while only 10% had found this business information through digital media. This low digital presence has resulted in Alify MSMEs losing the opportunity to reach a wider market segment, especially the younger generation and potential customers who are used to looking for service information through online platforms. This condition is in line with research findings that show that the majority of MSMEs in Indonesia still face significant obstacles in the adoption of digital technology for marketing, due to limited human capital, technological accessibility, and lack of practical assistance (Susanti & Widodo, 2020; Blessed & Day, 2017).

Beyond the specific case of Alify, the challenge of translating internet access into effective marketing capability is well documented in the Indonesian MSME literature. Recent community-service scholarship reports that a majority of micro-enterprises that already possess basic connectivity still do not operate an active business social media account, primarily because owners lack the time, design skill, and structured guidance needed to convert connectivity into usable marketing content (Tarmizi, Meliantari, & Suprayitno, 2026; Nurlaela, Fitri, Ririn Oktaviani, Rachim, & Paula, 2026). This pattern closely mirrors the condition observed at Alify MSME, where the owner possesses a smartphone and a stable internet connection but had never produced a single piece of promotional content before this program, indicating that the binding constraint is capacity-based rather than infrastructural. Chatterjee et al. (2021) similarly argue that digital transformation in small enterprises is frequently obstructed less by the absence of technology itself than by the absence of a structured adoption pathway that converts general digital literacy into marketing-specific skills such as content planning, visual branding, and platform analytics - a gap that is precisely what this program was designed to close.

A further gap emerges when this case is placed against existing MSME digital-assistance research: most published community-service interventions on MSME digital marketing report outcomes descriptively, through participant testimony or general observation, with comparatively few using a validated pre-post instrument and inferential statistics to quantify the magnitude and significance of change (Tarmizi et al., 2026; Nurlaela et al., 2026). This is a methodological gap the present program seeks to address. By administering a reliability-tested instrument before and after the intervention, this study is able to quantify the size of the change through an N-Gain index and test its statistical significance through a paired-samples t-test, rather than relying only on descriptive impressions of program success - an approach consistent with calls in the digital marketing literature for more rigorous, outcome-based evaluation of MSME digital assistance programs (Rahayu & Day, 2017; Kusumawati & Syahchari, 2021).

The root of the underlying problem is the limited knowledge and skills of MSME owners in the field of digital marketing, especially related to digital content creation, business social media account management, and the implementation of content-based promotion strategies. MSME owner Alify admitted that he did not know the content design application that was easy to use, did not have guidelines or standards in managing digital promotions, and felt confident to start building his business's digital presence. The absence of assistance from competent parties is the main inhibiting factor that causes Alify MSMEs to lag behind the development of the digital marketing ecosystem in their area. Without the transformation of marketing strategies from conventional patterns to structured digital marketing, the competitiveness of Alify MSMEs will be further eroded by competitors who are more digitally adaptive, while wasting the potential of the digital market which is actually very accessible if balanced with the right knowledge and skills (Setiawan & Primary, 2021; Ahmad, Abu Bakr & Ahmad, 2019).

To overcome these problems, Telkom University's Community Service team offers a solution based on Appropriate Technology (TTG) in the form of digital content implementation as a transformation of Alify's MSME

marketing strategy. The science and technology transferred includes: (1) basic knowledge of social media-based digital marketing; (2) digital content production skills using Canva's graphic design application which is freemium and easy to operate without prior design expertise; (3) Instagram Business and Facebook Page account management techniques including understanding content analytics; and (4) methods of preparing planned and measurable content marketing strategies. The TTG approach was specifically chosen because it presents technology that is simple, low-cost, can be practiced using devices already owned by partners, and is sustainable according to the capacity of micro enterprises (Wibowo & Haryanto, 2020). The designed work procedure includes five continuous stages: pre-activity survey and identification of partner needs; digital content design and preparation of training modules; direct training and implementation of content creation; assistance and optimization of digital marketing strategies; and post-activity evaluation using a structured survey with the same instrument.

In all stages of implementation, Alify MSMEs are not just beneficiaries, but are placed as the main subjects who actively participate. At the need identification stage, MSME owners are involved in the FGD to map the initial condition of the business and determine the priority of digital needs. At the design stage, partners provide service data, pricing information, and business operational documentation as content materials. At the training and implementation stages, partners are fully present in each session and directly practice content creation under the guidance of the team. In the mentoring stage, partners independently upload content, respond to customer interactions on social media, and create a monthly content calendar with the team. This active engagement is designed to ensure that the marketing transformation that occurs is sustainable and does not depend on the presence of external post-program companions, in line with the principles of Participatory Action Research (PAR) that places partners as independent agents of change in their communities (Mallapiang et al., 2020).

The output targets to be achieved through this service program include mandatory outputs and additional outputs. Mandatory outputs include: (1) increasing the capacity of partners in producing and managing digital marketing content independently, as evidenced by measurable achievements from pre- and post-activity surveys using Likert scale instruments 1–5 on four evaluation dimensions; (2) scientific publication of the results of service in reputable community service journals; and (3) video documentation of activities as a track record of program implementation. Additional outputs produced include: (1) Alify MSME business social media accounts that are active and professionally managed (Instagram Business and Facebook Page); (2) the initial digital content bank contains a minimum of 20 promotional content ready for upload; (3) practical guidance for TTG-based MSME digital marketing in print format that can be used as a post-program independent reference; and (4) a structured monthly content calendar. Overall, this program is expected to have a real impact in the form of transforming Alify's MSME marketing strategy from conventional patterns to content-based digital marketing that is effective, measurable, and sustainable, as well as becoming a replication model for MSMEs of similar services in the Pangandaran area and other regions.

II. Literature Review

2.1. Digital Marketing and the MSME Transformation Agenda

Digital marketing is broadly defined as the use of digital technologies and channels to create, communicate, and deliver value to customers, replacing or supplementing conventional marketing instruments such as print signage and word-of-mouth referral (Kotler, Kartajaya, & Setiawan, 2017; Kannan & Li, 2017). Kaplan and Haenlein (2010) frame this shift as fundamentally social: value is now co-created through interactive platforms rather than transmitted one-directionally from business to customer, a shift Aral, Dellarocas, and Godes (2013) describe as a structural transformation of how firms of all sizes compete for attention. For MSMEs specifically, this transformation is theorized to lower the cost of market entry and geographic reach relative to conventional promotion (Pradiani, 2017), yet empirical adoption studies consistently find that Indonesian MSMEs realize this potential unevenly. Susanti and Widodo (2020) and Rahayu and Day (2017) both report that limited human capital and the absence of structured assistance - rather than the absence of infrastructure - are the dominant constraints on MSME digital marketing adoption, while Nguyen, Newby, and Macaulay (2015) similarly find that small-business technology adoption depends more on perceived ease of use and available support than on cost alone. Alify MSME's pre-program condition, in which internet-capable devices were already present but had never been used for promotion, is consistent

with this literature and provides the theoretical justification for a capacity-building rather than a purely infrastructural intervention.

2.2. Digital Content as a Marketing Instrument

Within digital marketing, content functions as the primary unit through which a business communicates value, builds recognition, and sustains customer engagement (Centobelli, Cerchione, & Esposito, 2020). Dwivedi et al. (2021) argue that content quality and consistency are stronger predictors of audience engagement than posting volume alone, which underpins this program's decision to prioritize structured content planning (a monthly calendar) over ad hoc posting. Oktaviani and Rustandi (2018) find that consistent, scheduled content publication is positively associated with brand-awareness growth among small businesses, providing the theoretical basis for the Digital Brand Awareness dimension measured in this study. At the relational level, Tiago and Veríssimo (2014) demonstrate that digital channels can bring MSMEs structurally closer to customers by lowering the cost of two-way interaction, which underlies the Customer Interaction Satisfaction dimension. Taken together, this body of literature suggests that digital content should not be evaluated only on production volume, but on four interlocking outcomes - awareness, quality, accessibility of promotion, and interaction quality - which this program adopts directly as its four measurement dimensions.

2.3. Appropriate Technology (TTG) in Community-Based MSME Empowerment

Appropriate Technology (Teknologi Tepat Guna/TTG) refers to technology interventions deliberately scaled to match the recipient's existing resources, technical capacity, and post-program sustainability rather than to the most advanced tool available (Wibowo & Haryanto, 2020). This principle guided the selection of Canva - a freemium, browser- and smartphone-based design tool - over professional desktop design software that would require both a paid license and prior design training the partner did not have. The TTG approach was chosen over two commonly used alternative models in MSME digital assistance: a single-session digital literacy workshop, which typically produces short-term awareness but low skill retention because participants do not apply the material to their own business content during the session; and a fully outsourced digital marketing service, in which an external party manages the MSME account on the owner's behalf, producing immediate visible output but no internal capacity transfer and a high risk of discontinuation once the paid service ends. Because Alify MSME is a single-owner operation with no dedicated marketing staff, sustainability after the program depends entirely on the owner's own capability, which is the specific condition TTG is theorized to address (Wibowo & Haryanto, 2020).

2.4. Participatory Action Research (PAR) as the Implementation Framework

Participatory Action Research positions the beneficiary as a co-researcher who helps identify problems, test solutions, and evaluate outcomes together with the facilitating team, rather than as a passive recipient of a fixed training curriculum (Mallapiang et al., 2020). PAR was selected as the implementation framework because it is theorized to produce more durable behavior change than top-down training models, since the beneficiary internalizes ownership of both the problem and the solution (Zahra & Wright, 2016). This is particularly relevant for the creative, judgment-based tasks involved in content marketing - such as deciding which service to promote or how to frame a testimonial - which cannot be fully standardized in a generic training script and instead require the kind of contextual, entrepreneurial creativity that Fillis and Rentschler (2010) identify as central to small-business marketing success. Nalhadi et al. (2020) further note that PAR-based interventions with small, homogeneous respondent groups (such as the 30-respondent customer base used here) allow the same participants to be tracked across pre- and post-measurement, strengthening the

internal validity of the before-after comparison relative to designs that survey different respondents at each time point.

2.5. Conceptual Framework and Research Proposition

Synthesizing the discussion above, this study integrates three theoretical strands - digital content marketing theory, Appropriate Technology, and Participatory Action Research - into a single implementation model in which the partner co-produces a content-based marketing transformation using low-cost, self-sustaining tools, and the resulting change is measured using a validated instrument across four theoretically grounded dimensions: digital brand awareness (Oktaviani & Rustandi, 2018; Aral et al., 2013), content quality (Centobelli et al., 2020; Dwivedi et al., 2021), promotional affordability (Kannan & Li, 2017), and customer interaction satisfaction (Tiago & Veríssimo, 2014). Based on this framework, the study is guided by the following research proposition: the implementation of digital content training within a combined TTG-PAR framework will produce a statistically significant improvement in all four dimensions among Alify MSME's customer base between the pre- and post-activity measurement points. This proposition is tested empirically in Section IV.

III. Research Method

3.1. Materials and Tools

The main materials and tools used include: (1) hardware in the form of desktop computers (PCs) and smartphones owned by partners; (2) Canva graphic design application (Pro version, accessed via Canva for Education); (3) Instagram Business social media platforms and Facebook Page; (4) Google Forms for online survey instruments; (5) Microsoft Excel for survey data processing; (6) projector and presentation screen; (7) team-developed digital marketing training modules; and (8) backdrops and plaques as the completeness of the activity.

3.2. Design and Method Approach

The implementation of the activity uses the Participatory Action Research (PAR) approach combined with the Appropriate Technology (TTG) method. The PAR approach places partners as active subjects who are directly involved in the entire planning, implementation, and evaluation process (Mallapiang et al., 2020). The TTG method ensures that the transferred technology is applicable, simple, and sustainable according to the capacity of the partner (Wibowo & Haryanto, 2020). This combination was selected over two commonly used alternative models in MSME assistance. The first alternative, a single-session digital literacy workshop, typically produces short-term awareness but low retention of practical skill because participants are not involved in applying the material to their own business content. The second alternative, a fully outsourced digital marketing service in which an external party manages the MSME's account on the owner's behalf, produces immediate visible output but transfers no internal capacity and carries a high risk of discontinuation once the paid service ends. PAR was chosen because it positions the partner as a co-researcher who identifies problems, tests solutions, and evaluates outcomes together with the service team - essential for a single-owner micro-enterprise whose post-program sustainability depends entirely on the owner's own capability. TTG was chosen as the technical delivery mechanism because it constrains every recommended tool and workflow to what the partner can realistically operate and afford after the program ends: a free/freemium design application, existing smartphone hardware, and free-tier social media platforms, rather than tools that require ongoing subscription cost or specialized equipment.

To measure the effectiveness of the program in a measurable way, activities used a pre-post survey design with a structured questionnaire instrument on a Likert scale of 1–5. The survey was conducted to two

groups of respondents: (1) active customers and prospective customers of Alify's MSMEs; and (2) the owner/manager of Alify MSMEs as a partner. A comparison of pre- and post-activity scores was used to measure the rate of change on four dimensions: digital brand awareness, content quality, promotional affordability, and customer interaction satisfaction. The pre- and post-activity survey design compared the same 30 respondents' scores at two points separated by the six-month intervention (February and August 2026). At each point, respondents completed the identical 20-item instrument; the paired-samples t-test was then used, rather than an independent-samples test, specifically because the two measurements come from the same individuals, which controls for between-respondent variation and isolates the change attributable to the intervention itself. This design choice - a paired rather than independent comparison - was selected because the research question concerns within-person change in perception over time, not a difference between two separate groups.

3.3. Population and Survey Sample

The survey population is active and potential customers of Alify MSMEs in Pananjung Village and its surroundings. The sample was determined using a purposive sampling technique with the following criteria: (1) having used or knowing Alify's MSME services; (2) domiciled in Pangandaran District; and (3) willing to fill out a questionnaire. The number of samples was set at 30 respondents, referring to the principle of minimum sample size in small-scale action research (Nalhadi et al., 2020).

Respondents were recruited through the service team's field presence at Alify MSME's outlet and through referrals from the partner's existing customer base over a two-week recruitment window in February 2026. The purposive criteria were applied to ensure respondents had sufficient first-hand or intended experience with Alify's services to meaningfully judge the four evaluation dimensions; individuals with no prior awareness of the business were excluded, since they could not assess dimensions such as content recall or promotional affordability at either measurement point. The sample of 30 respondents follows the minimum threshold commonly applied in small-scale, single-site PAR studies where the unit of analysis is a single MSME's customer base rather than a population-level estimate (Nalhadi et al., 2020). The same 30 respondents were retained for both the pre- and post-activity survey to enable a paired comparison, and all 30 completed both waves (0% attrition), achieved by maintaining direct WhatsApp contact with each respondent throughout the six-month program.

Table 1. Survey Respondent Profile (n=30)

Features	Category	Number (n=30)
Gender	Male	18 (60,0%)
	Women	12 (40,0%)
Age	17–25 years old	10 (33,3%)
	26–35 years old	11 (36,7%)
	36–45 years old	6 (20,0%)
	> 45 years old	3 (10,0%)
Education	High School/Vocational School	12 (40,0%)
	D3/S1	15 (50,0%)
	S2/S3	3 (10,0%)
Status	Active customers	20 (66,7%)
	Potential customers	10 (33,3%)

3.4. Survey Instruments

The survey instrument was prepared in the form of a structured questionnaire with 20 statements that measured four evaluation dimensions, each with 5 items. Each item was measured using a Likert scale of 1 (strongly disagree) to 5 (strongly agree). The questionnaire was validated through a content validity test by two digital marketing experts, then a Cronbach's Alpha reliability test was carried out with a value of 0.87 (good/reliable category). Average score interpretation: 1.00–1.80 (very low); 1.81–2.60 (low); 2.61–3.40 (moderate); 3.41–4.20 (height); 4.21–5.00 (very high). The N-Gain value is calculated: $N\text{-Gain} = (\text{Post Score} - \text{Pre Score}) / (\text{Max Score} - \text{Pre Score})$, with an interpretation of < 0.30 (low); 0.30–0.70 (moderate); > 0.70 (high). Questionnaires were administered through two complementary channels to maximize response completeness. Nineteen of the 30 respondents - mostly local residents and walk-in customers encountered at the Alify outlet or nearby public spaces - completed a printed version of the questionnaire with a team member present to clarify items when needed, while the remaining 11 respondents - mostly younger, more digitally-active potential customers - completed an identical Google Forms version shared through WhatsApp. Both versions used identical item wording, ordering, and five-point Likert anchors, and responses from both channels were merged into a single dataset in Microsoft Excel prior to analysis. Respondent participation was encouraged through a brief in-person explanation of the program's purpose and a small token of appreciation (a discount voucher for Alify's services), and every respondent who completed the pre-activity survey was individually re-contacted for the post-activity survey to preserve the paired design.

In addition to the quantitative Likert-scale data, the program also collected qualitative data in the form of open-ended FGD notes with the partner at the need-identification stage and semi-structured interview transcripts with the partner at the post-activity stage (Phase 5). These qualitative sources were used to contextualize and triangulate the quantitative survey findings - for example, to help explain why the Content Quality dimension improved the most (Section IV.F) and to surface operational challenges not captured by the Likert items (Section IV.H). Qualitative data were analyzed thematically by two members of the service team, who independently coded the interview and FGD transcripts and reconciled coding differences through discussion.

Table 2. Dimensions and Indicators of Survey Instruments

No	Dimensions	Indicator	Code
1	Digital Brand Awareness (KMD)	Recognizing the MSME via social media; knowing the service via online content; following the account; viewing regular content; recommending based on digital information	KMD1-KMD5
2	Content Quality (KK)	Visually appealing content; clear service information; easy-to-understand language; relevant content; professional appearance	KK1-KK5
3	Promotional Affordability (KP)	Promotions are easy to find; content is easy to share; price information is easily accessible; consistent promotion; easy to contact via social media	KP1-KP5
4	Customer Interaction Satisfaction (KIP)	Quick response; accurate information; online service helps decision-making; satisfactory interaction; intention to continue using digital content-based services	KIP1-KIP5

3.5. Stages of Program Implementation

The activity was carried out for six months (February-August 2026) through five continuous stages. An overview of the stages is presented in Table 3.

Table 3. Schedule and Stages of Implementation

No	Period	Main Activities	Output
1	Feb 2026	Pre-activity Survey & Needs Identification	Baseline data; digital needs profile; Problem Reports
2	Mar 2026	Digital Content Design & Module Preparation	Digital branding concept; content templates; Training Modules
3	Apr–May 2026	Digital Content Training & Implementation	Active social media accounts; 20+ content; Practice Track Record
4	Jun–Jul 2026	Mentoring & Strategy Optimization	Content calendar; performance reports; Practical Guide (print)
5	Aug 2026	Post-Activity Survey & Evaluation	Post-survey data; evaluation reports; recommendations; Publications

Phase 1 (February 2026): The pre-activity survey was conducted by distributing questionnaires to 30 respondents offline and online (Google Forms). In parallel, the identification of partner needs was carried out through field observation and Focus Group Discussion (FGD) with the owner of Alify MSMEs, Mrs. Lala Komalasari. Phase 2 (March 2026): The service team designed Alify's MSME digital marketing ecosystem including: (1) digital visual identity (logo, color palette, typography); (2) content templates in three categories informative services, educational computer maintenance tips, and offer promotions; (3) Canva's four-session step-by-step training module; and (4) a monthly content calendar guide. Phase 3 (April–May 2026): The training was carried out in two waves, two days each. The first wave focused on digital literacy and Canva mastery (business account creation, poster/feed/story design, caption writing). The second wave focuses on content strategy and analytics (Meta Business Suite, Instagram Insights, hashtag research, responding to messages).

The digital marketing training module used in Phase 3 was developed by the service team specifically for this program and consisted of four sessions of approximately 90 minutes each, combining short conceptual explanation (15-20 minutes per session) with guided hands-on practice on the partner's own smartphone using the Canva application. The module's content was deliberately structured around the four measurement dimensions of the survey instrument - for example, the visual-design session targeted Content Quality, while the account-optimization session targeted Promotional Affordability and Customer Interaction Satisfaction - so that the training curriculum and the evaluation instrument were aligned by design rather than coincidentally. The module was validated by the same two digital marketing experts who validated the survey instrument and was revised once based on their feedback to simplify the terminology used for a first-time smartphone-based design user. Phase 4 (June–July 2026): Intensive mentoring once every two weeks (four times in total) offline and via WhatsApp Group, including content performance evaluation based on analytics data, content improvement coaching, monthly content calendaring, and practical guide refinement. Phase 5 (August 2026): The post-activity survey was carried out with the same instruments and respondents, followed by in-depth interviews with MSME owners. Data were analyzed using descriptive statistics and paired t-test ($\alpha = 0.05$).

IV. Results and Discussion

4.1. Initial Condition of Partners (Pre-activity)

The results of field observations and FGDs in February 2026 revealed that Alify's MSME marketing conditions before the program were met: no business social media accounts, never producing digital content, and relying entirely on old customer recommendations. From the external side, 73.3% of respondents stated that they knew about Alify MSMEs only from the recommendations of the closest people or physical nameplates, and only 10% had found Alify MSME information through digital media.

4.2. Pre-activity Survey Results

A pre-activity survey of 30 respondents (February 2026) showed that the digital marketing condition of Alify MSMEs is in the very low to low category in all dimensions (Table 4). The Digital Brand Awareness (KMD) dimension obtained the lowest scores (mean = 1.72; very low), Content Quality (mean = 1.95; low), Promotional Affordability (mean = 1.88; low), and Customer Interaction Satisfaction (mean = 1.93; low). Overall pre-activity average: 1.87 (low).

Table 4. Pre-activity Survey Results per Dimension (n=30)

No	Dimensions	Red	SD	Min–Max	Category
1	Digital Brand Awareness	1,72	0,38	1,00–2,40	Very Low
2	Content Quality	1,95	0,42	1,20–2,60	Low
3	Promotional Affordability	1,88	0,45	1,00–2,80	Low
4	Interaction Satisfaction	1,93	0,41	1,20–2,60	Low
	Average	1,87	0,41	1,00–2,80	Low

4.3. Program Implementation and Activity Outcomes

The service program runs according to schedule. At the training stage, partners completed four sessions with 100% attendance. During the implementation period, partners managed to produce 24 original digital content uploaded to their Instagram Business (@alifycomputer.pangandaran) and Facebook Page: 10 service informative content, 8 educational content on care tips, and 6 promotional/testimonial content. At the mentoring stage, social media analytics data showed positive developments: 127 new followers, an average reach per content of 340 accounts, and an average engagement rate of 4.8% above the local MSME industry average of 2–3% (Dwivedi et al., 2021). Partners also completed a 24-page digital marketing practical guide as a post-program self-reference.

4.4. Post-Activity Survey Results

Post-activity surveys (August 2026, 30 same respondents) showed significant improvements across all dimensions. The overall average increased from 1.87 to 4.12, with an N-Gain of 0.75 (high category). Details are presented in Table 5.

Table 5. Comparison of Pre and Post-Activity Surveys (n=30)

No	Dimensions	To	Pasca	D	N-Gain	Kat.
1	Case. Digital Brands	1,72	4,05	2,33	0,71	Height
2	Content Quality	1,95	4,21	2,26	0,82	Height
3	Ktjng. Promotion	1,88	4,10	2,22	0,74	Height
4	Interaction Satisfaction	1,93	4,13	2,20	0,75	Height
	Average	1,87	4,12	2,25	0,75	Height

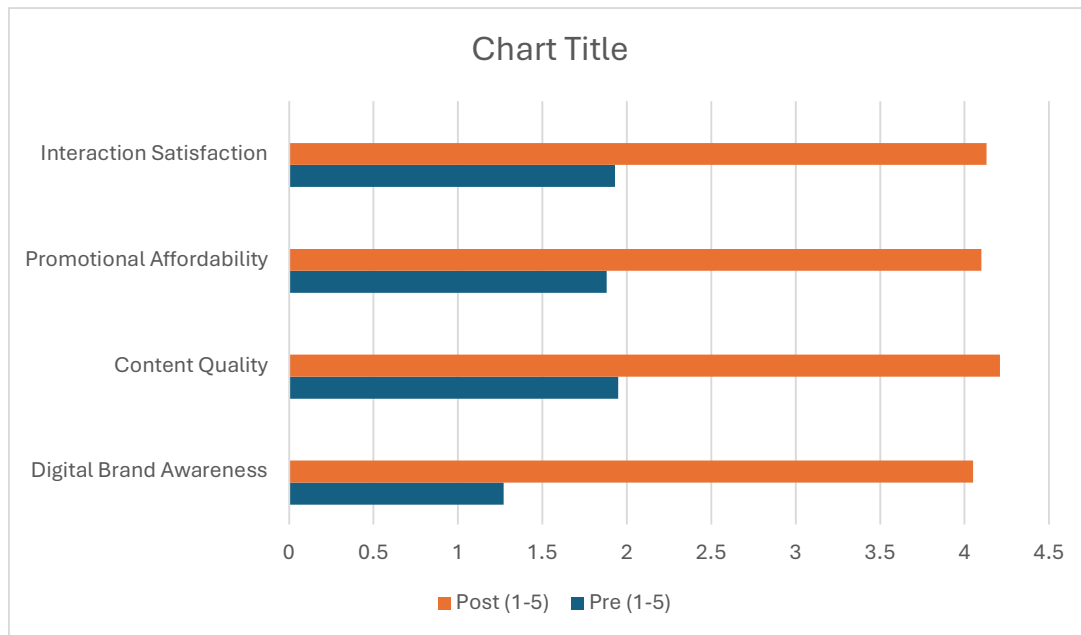


Figure 1. Visual Trend of Pre- to Post-Activity Score Change per Dimension

4.5. Significance Test (Paired t-test)

The results of the paired t-test showed that all dimensions had a p-value = 0.000 ($p < 0.05$), which means that there was a statistically significant difference between pre- and post-activity scores in all evaluation dimensions (Table 6). The service program has proven to be effective in having a real impact on increasing the digital marketing capacity of Alify MSMEs.

Table 6. Paired t-test results per Dimension ($\alpha = 0.05$)

No	Dimensions	t-count	df	p-value	Conclusion
1	Case. Digital Brand (KMD)	18,47	29	0,000	Significant ($p < 0.05$)
2	Content Quality (KK)	21,33	29	0,000	Significant ($p < 0.05$)
3	Ktjng. Promotion (KP)	19,82	29	0,000	Significant ($p < 0.05$)
4	Interaction Satisfaction (KIP)	20,15	29	0,000	Significant ($p < 0.05$)

Beyond statistical significance, the practical significance of these results lies in the consistency of the effect across all four dimensions: none of the p-values approached the 0.05 threshold, and all four N-Gain values fell within the "high" category (> 0.70), indicating that the intervention's effect was not concentrated in a single easy-to-improve dimension but was distributed relatively evenly across awareness, content, promotion, and interaction. For MSME digital marketing practice, this suggests that a single integrated training-and-mentoring package - rather than separate interventions targeting each dimension individually - can be a cost-effective strategy for micro-enterprises with limited time and budget to allocate toward capacity building.

4.6. Discussion of Results by Dimension

The Digital Brand Awareness (KMD) dimension recorded the largest absolute increase (mean $1.72 \rightarrow 4.05$; N-Gain 0.71). After the program, 76.7% of respondents stated that they knew about Alify's MSME services through social media and 60% had followed the Instagram account of a new business. Consistency of posting at least three times a week according to the content calendar is the main driving factor (Oktaviani & Rustandi, 2018). The Content Quality (KK) dimension recorded the highest N-Gain (0.82), increasing from 1.95 to 4.21. Canva-based content design training designed step-by-step successfully overcame the technical barriers of partners. Respondents gave positive assessments on visual display (mean $KK1 = 4.35$), clarity of information ($KK2 = 4.18$), and relevance of content ($KK4 = 4.27$), supporting the argument of Centobelli et al. (2020) that practical knowledge-based training is effective in improving the quality of MSME digital output.

The Promotional Affordability (KP) dimension increased from 1.88 to 4.10 (N-Gain 0.74). The biggest improvements in the ease of finding promotions on social media ($KP1$; mean post = 4.23) and ease of contacting businesses ($KP5$; mean post = 4.40), were driven by the integration of WhatsApp Business into Instagram profiles and Facebook Pages. This finding is in line with Tiago and Veríssimo (2014) that digital marketing is able to bring MSMEs closer to customers effectively. The Customer Interaction Satisfaction Dimension (KIP) increased from 1.93 to 4.13 (N-Gain 0.75). Respondents rated high response speed ($KIP1$; mean = 4.07) and interaction satisfaction ($KIP4$; mean = 4.18). MSME owners stated that they are now more confident in interacting with potential customers and feel an increase in incoming inquiries from new customers, consistent with the findings of Ahmad et al. (2019).

4.7. Comparison with Previous Studies and Theoretical Implications

Compared with related community-service (PKM) interventions recently published in Golden Ratio journals, the magnitude of improvement recorded in this program is comparatively strong. Tarmizi, Meliantari, and Suprayitno (2026), who implemented a similar digital marketing empowerment program in Semper Barat, North Jakarta, reported measurable improvement in participants' digital literacy and promotional skill but described early economic impact as modest and did not report an inferential statistical test of significance. Nurlaela, Fitri, Ririn Oktaviani, Rachim, and Paula (2026), who combined branding and digital marketing training for MSMEs in Sawaru Village, likewise reported skill and account-management improvement but relied on descriptive rather than statistically validated outcome measures. The present study extends this line of community-service research by using a validated instrument, an N-Gain index, and a paired t-test, providing a more rigorous, quantifiable basis for claiming that the observed transformation is unlikely to be attributable to chance ($p < 0.05$ across all four dimensions).

At the same time, two findings deserve closer examination against existing theory rather than being read as uniformly confirmatory. First, although Digital Brand Awareness recorded the largest absolute score increase, it recorded the lowest N-Gain (0.71) among the four dimensions - a partial departure from Marketing 4.0 theory (Kotler et al., 2017), which frames brand awareness as an immediate, low-effort outcome of increased digital visibility. A plausible contextual explanation is that awareness diffuses through a respondent's social network with a time lag, whereas content-quality perception can be judged the moment

a respondent views a single post; this is consistent with Aral et al. (2013), who note that social-media-driven awareness effects compound over a longer period than content-level effects, which are visible immediately upon publication. Within this program's six-month window, awareness may therefore still be under-realized relative to its eventual ceiling. Second, Customer Interaction Satisfaction, despite a substantial N-Gain of 0.75, recorded the second-lowest post-activity mean (4.13) among the four dimensions. This is a partial departure from relationship-marketing theory (Tiago & Veríssimo, 2014), which predicts that once a business establishes multi-channel digital contact points, interaction quality should approach parity with content-related dimensions. A plausible contextual explanation is that Alify MSME remained a single-owner operation throughout the program: the same individual who produced content, managed inventory, and served walk-in customers was also responsible for answering digital messages, which limited response consistency during peak hours - a constraint the partner raised directly during the post-activity interview (Phase 5) and one consistent with the capacity constraints reported among single-owner MSMEs elsewhere (Chatterjee et al., 2021).

4.8. Changes in Partner Conditions

Table 7. Partner Conditions Before and After the Program

Aspects	Before	After
Digital Presence	No business account	IG Business & FB Page account active
Content Production	Never	Min. 3 contents/week independent
Visual Identity	No branding	Logos, templates, consistent color palette
Marketing Strategy	Conventional	Digital, monthly content calendar
Market Reach	Customers stay local	127 new followers; reach 340/content
Customer Interaction	Face-to-face & phone	Copyright © 2019 Whatsapp Business. All Rights Reserve
SOP Guide	None	24-page practical guide
Marketing Analytics	None	Monitor IG Insights regularly

4.9. Supporting and Inhibiting Factors

Factors that support the success of the program: (1) motivation and active participation of MSME owners who are consistently present at each session; (2) the availability of basic digital infrastructure (Android smartphones and internet connections); (3) a freemium-based Canva application that significantly lowers technical barriers; and (4) support for the Pangandaran tourism environment as a potential market for locally-themed digital content. The challenge encountered: the limited time of the owner who is also a marketing engineer and manager causes the frequency of first month posts to not reach the target. This is overcome by simplifying the production process and preparing a content bank one month in advance for each mentoring session. Unstable internet connections are sometimes overcome by downloading applications and preparing content offline first.

V. Conclusion

The Community Service Program based on Appropriate Technology was carried out through five continuous stages: pre-activity survey and needs identification, digital content design and module preparation, digital content training and implementation, mentoring and strategy optimization, and post-

activity survey and evaluation. Key measurable contributions include: (1) the overall average score increased from 1.87 to 4.12, with an N-Gain of 0.75 (high); (2) all dimensions showed statistically significant differences ($p < 0.05$); (3) Alify MSME succeeded in building an active digital presence with 127 new followers and an engagement rate of 4.8%; and (4) the preparation of a 24-page digital marketing practical guide. Program limitations include single-partner coverage and a six-month duration that does not yet allow longitudinal measurement of impact on turnover growth.

Several methodological improvements are recommended for follow-up studies and for replication with other MSMEs. First, future evaluations should extend the measurement window beyond six months and incorporate at least one delayed follow-up survey (e.g., at 12 and 24 months post-program) to test whether the Digital Brand Awareness gains observed here - which recorded the lowest N-Gain among the four dimensions - continue to compound over time, consistent with the slower diffusion pattern theorized for social-media-driven awareness (Aral et al., 2013). Second, subsequent programs are encouraged to add turnover, transaction volume, or lead-conversion data as an outcome variable alongside the perception-based Likert instrument used here, so that the relationship between digital marketing capacity and actual business performance can be tested directly rather than inferred. Third, because Customer Interaction Satisfaction was constrained by the partner's single-owner operating structure, future interventions for comparable single-owner MSMEs should consider incorporating a basic response-management routine (e.g., scheduled reply windows or simple message templates) as an explicit training component. Finally, replicating this TTG-PAR model across a small cohort of similar service-based MSMEs in Pangandaran, rather than a single partner, would allow between-partner comparison and would strengthen the generalizability of the transformation model proposed in this study.

Acknowledgments

The author would like to express his gratitude to the Telkom University Community Service Institute for the support of funding for the 2026 Appropriate Technology Scheme, to the Applied Digital Business, Entrepreneurship & Tourism (KK DBEST) Expertise Group of the Faculty of Applied Sciences for academic guidance, and to Alify MSMEs especially Mrs. Lala Komalasari for their trust and active participation that is very meaningful. Appreciation was also conveyed to all 30 survey respondents for their time and contribution.

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