

THE UTILIZATION OF DIGITAL MARKETING STRATEGIES TO IMPROVE TILAPIA MARKETING AT MERUYUNG FISH FARM

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Abstract. The main challenges faced by freshwater fish farming MSMEs, such as Meruyung Fish Farm in Depok, are the efficiency of the aeration system and conventional marketing management. This results in low productivity, high operational costs, and minimal market competitiveness. To overcome these problems, the community service team implemented two strategic solutions: technology and innovation, as well as improvements in marketing management. The technological approach focused on the design and application of Superchargers as an energy-efficient aeration system. This technology can effectively increase dissolved oxygen levels, which positively impacts fish growth, feed efficiency, and survival rates. Previous research shows that one Supercharger unit can aerate up to 10 pounds, significantly reducing energy consumption compared to conventional methods. On the other hand, marketing management improvements were carried out through business incubation and digital marketing. These activities include training in processed product diversification, promotional content creation, social media and e-commerce management. Thus, this program not only improves productivity from a technical perspective but also strengthens the business capacity of partners to be more competitive and sustainable in the market. The expected outcome is a 20% increase in the production capacity and sales turnover of partners.

Keywords: digital marketing, fish farm, MSMEs

Abstrak. Tantangan utama yang dihadapi oleh UMKM budidaya ikan air tawar, seperti Meruyung Fish Farm di Depok, adalah efisiensi sistem aerasi dan manajemen pemasaran yang masih konvensional. Hal ini mengakibatkan produktivitas yang rendah, tingginya biaya operasional, dan daya saing pasar yang minim. Untuk mengatasi masalah tersebut, tim pengabdian masyarakat mengimplementasikan dua solusi strategis: teknologi dan inovasi, serta perbaikan manajemen pemasaran. Pendekatan teknologi berfokus pada perancangan dan penerapan Supercharger sebagai sistem aerasi hemat energi. Teknologi ini mampu meningkatkan kadar oksigen terlarut secara optimal, yang berdampak positif pada pertumbuhan ikan, efisiensi pakan, dan tingkat kelangsungan hidup. Hasil riset sebelumnya menunjukkan bahwa satu unit Supercharger dapat mengaerasi hingga 10 kolam, mengurangi konsumsi energi secara signifikan dibandingkan dengan metode konvensional. Di sisi lain, perbaikan manajemen pemasaran dilakukan melalui inkubasi bisnis dan pemasaran digital. Kegiatan ini mencakup pelatihan diversifikasi produk olahan, pembuatan konten promosi, dan pengelolaan media sosial serta e-commerce. Dengan demikian, program ini tidak hanya meningkatkan produktivitas dari aspek teknis, tetapi juga memperkuat kapasitas bisnis mitra agar lebih kompetitif dan berkelanjutan di pasar. Hasil yang diharapkan adalah peningkatan kapasitas produksi dan omzet penjualan mitra sebesar 20%.

Kata Kunci: pemasaran digital, peternakan ikan, UMKM

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INTRODUCTION

Aquaculture has become a crucial sector of global fisheries because it provides a sustainable protein source while reducing pressure on declining wild fish stocks due to overfishing (Wasik et al., 2025). This makes aquaculture a global food security strategy,



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including in Indonesia. In Indonesia, aquaculture plays a central role in meeting animal protein needs while supporting the economy. This demonstrates the significant growth of the aquaculture sector, which serves as a major driver of the coastal economy. According to Bjørndal et al. (2024) and The State of World Fisheries and Aquaculture 2020 (2020), more than 2.8 million households rely on aquaculture as their primary source of income. Furthermore, this sector creates employment opportunities across various fishery value chains.

As noted by Mala et al. (2024) and Putri et al. (2023), Micro, Small, and Medium Enterprises (MSMEs) play a vital role in the Indonesian economy as employment providers and major contributors to economic growth. Aquaculture is also a rapidly developing business sector at the MSME scale. Meruyung Fish Farm is an example of an MSME with significant potential in aquaculture as shown in Figure 1. Located in Depok, this business focuses on cultivating fish consumption with a production capacity capable of meeting local market demands. Although its development prospects are highly promising, Meruyung Fish Farm still faces obstacles in marketing. This issue arises because their current sales system relies on conventional methods. Consequently, their market reach remains limited to consumers within the immediate business vicinity. This situation leaves digital market opportunities underutilized. Technology-based marketing strategies, however, can significantly help increase revenue and strengthen business competitiveness amidst the competition in the fisheries industry.

Digital marketing serves as an effective pathway for MSMEs in the Indonesian fisheries sector, particularly in the aquaculture subsector. It allows them to expand their market reach by utilizing online platforms to increase visibility, strengthen customer interaction, and conduct more targeted advertising (Ketut Sumardana et al., 2024). The rapid development of digital technology and internet usage in Indonesia opens massive opportunities for MSMEs to overcome conventional marketing limitations and reach a broader market (Octaviana & Andni, 2023). Business owners must proactively respond to shifting consumer behaviours that increasingly rely on digital technology. The emergence of various internet-based online shopping platforms provides significant opportunities for MSMEs to introduce and market their products and services (Bangun & Purnama, 2022).

One of the primary benefits of digital marketing is its ability to directly address the market reach challenges faced by fishery MSMEs (Lailiyah et al., 2026; Nusantara et al., 2024). Historically, these enterprises have relied primarily on traditional and highly localized marketing methods, such as word-of-mouth promotion and direct sales within their surrounding communities (Hikam & Abdi, 2025). While these approaches have been effective in maintaining existing customers, they have significantly limited opportunities to reach wider markets and attract new consumers (Nwosu et al., 2024). Consequently, the growth potential of these businesses has often been constrained by their limited promotional channels and low online visibility.

Therefore, this community service program was specifically designed to address the conditions experienced by the partner by introducing practical digital marketing strategies that are relevant to the characteristics and needs of fishery MSMEs. The program provided guidance on utilising digital platforms to promote products more effectively, strengthen brand identity, and improve customer engagement. By adopting these digital marketing practices, the partner is expected to expand market access, increase product competitiveness, enhance sales performance, and establish a more sustainable business presence in the increasingly competitive digital marketplace.

METHOD

Data collection was conducted through a pre-test and a post-test to evaluate the effect of the community service implementation on the respondents' behavioral changes (Engelsbel et al., 2024). The respondents consisted of the employees and the owner of the Meruyung Fish Farm MSME, with a total of 10 individuals.

Survey Implementation

The survey implementation involved a set of structured questions aimed at assessing changes in perception regarding digitalization and the use of social media as a business step for market expansion. The team conducted this mapping by asking several questions presented in Table 1. The questions formulated in this instrument were comprehensively designed to map the digital transformation readiness and mindset changes of the Meruyung Fish Farm MSME actors. Overall, the eight questions aimed to measure three main dimensions. These dimensions include conceptual understanding of digital platforms and e-commerce functions (as in questions 1 and 4), perception of the economic benefits offered by technology (questions 2 and 5), and technical confidence and behavioral commitment in managing promotional content and online store operations (questions 3, 6, 7, and 8). The simplified questions were distributed to be filled out by respondents in the field.

Table 1. *The proposed questions*

No.	Questions posed to respondents
1	I understand the function of social media as a business promotional tool.
2	I am confident that social media can increase my business customer base.
3	I feel capable of creating simple promotional content (text, photos, or short videos).
4	I understand the basic methods of opening and managing a store on a marketplace or e-commerce platform.
5	I believe the use of social media and e-commerce can increase business revenue.
6	I am willing to allocate time regularly to manage business social media accounts.
7	I feel confident in utilizing promotional features (such as paid advertisements) on social media or e-commerce platforms.
8	I am interested in learning further online promotional strategies to improve my business.

The Use of a Likert Scale

As presented in Table 2, the community service team used a Likert Scale with a range of 1 to 5 to quantify the questions in the instrument. The use of this scale served to transform qualitative indicators into measurable data. This step is necessary to conduct further testing analysis to ensure whether the community service activities provided a real impact on the respondents (Koo & Yang, 2025). Consequently, the team could perform valid statistical analysis.

Table 2. *Likert scale*

Score	Description on the Likert Scale
1	Strongly disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly agree

The respondents' perception data obtained from the eight survey questions were quantified using a 5-point Likert Scale. The value range moved from a score of 1 for the statement "Strongly Disagree" to a score of 5 for "Strongly Agree". This scale was utilized to translate qualitative indicators such as understanding social media functions, confidence in creating content, and willingness to manage store accounts into numerical data. This data transformation is crucial so that the community service team can conduct measurable statistical analysis regarding changes in the partner's behavior and digital readiness before and after the activities..

Questionnaire Distribution Media

For the efficiency and accuracy of data collection, the survey instrument was distributed online using the Google Forms platform. This specific medium was chosen due to its high accessibility. It allowed respondents (employees and MSME owners) to fill out the

questionnaire through their respective mobile devices without disrupting their working hours. Furthermore, the automatic data export feature into a structured format (spreadsheet or CSV) on Google Forms minimized the risk of human error in the manual data recapitulation process. Therefore, data integrity was maintained.

Limitations and Assumptions

The analytical model in this study was built upon several basic assumptions. First, all respondents were assumed to provide honest and objective answers reflecting the actual conditions without any external pressure. Second, in the context of statistical testing, the difference data between the pre-test and the post-test was assumed to be normally distributed. This normality assumption became the main prerequisite for the validity of using the parametric paired t-test to measure the significance of the community service program's impact on changes in the partner's perception. This study has a primary limitation on the sample size used. The sample was limited to 10 respondents consisting of employees and owners within the internal environment of the Meruyung Fish Farm MSME. The small sample size and the specific research location in a single business partner caused the results of this analysis to be casuistic.

RESULT AND DISCUSSION

After the implementation of the methods described in the previous section, the community service process proceeded to the data collection stage. This data collection was conducted through a pre-test and a post-test. For ease of reference, questions number one through eight are symbolized as Q1 to Q8. The respondents are labeled from Respondent 1 to Respondent 10. Therefore, Respondent 1 in the pre-test refers to the same individual as Respondent 1 in the post-test. The pre-test and post-test data are presented in Figure 2 and Figure 3.



Figure 1. Documentation of the community service team with the Meruyung Fish Farm MSME

Based on the quantitative data presented in Figure 2, the baseline assessment indicates that the partner's digital readiness level was still on the low spectrum prior to the implementation of the program intervention. The pre-test score distribution of the ten respondents was dominated by values on scales 1 and 2, demonstrating that the participants possessed only limited knowledge and practical experience in utilizing digital technologies for business development. This finding empirically indicates a significant gap between the respondents' existing competencies and the increasingly complex demands of the digital marketing ecosystem. The response pattern further suggests that most participants lacked a comprehensive understanding of digital marketing strategies and had limited technical confidence in optimizing social media platforms and e-commerce marketplaces as effective promotional and sales channels (Devi et al., 2025; Karundeng & Suyanto, 2025). These results

highlight the need for structured capacity-building initiatives that not only introduce fundamental digital marketing concepts but also provide practical, hands-on training to improve participants' digital competencies and readiness to compete in an increasingly technology-driven business environment (Siswanta et al., 2026).

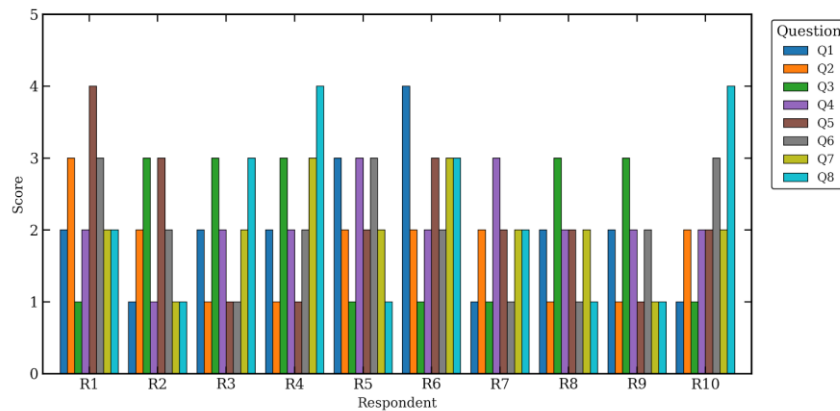


Figure 2. Pre-test result

Specifically, the variability of responses regarding technical indicators, such as content creation capability (Q3) and the utilization of paid promotional features (Q7), tended to be homogeneously low. This implies that the primary obstacle faced by the partner was not merely conceptual unfamiliarity but also operational and psychomotor inability to execute digital strategies. Although a few values reached a scale of 3 or 4 for certain respondents, such as Respondent 6 for Q1 and Respondent 1 for Q5, these figures represented minor anomalies that did not alter the general profile of the group. The group still required intensive mentoring. The factual conditions recorded in this pre-test validated the urgency of implementing the community service program. The low initial average score established a strong foundation for the necessity of a structured approach. This approach must range from cultivating a digital mindset to providing technical training. Furthermore, this data serves as a comparative baseline to measure the effectiveness of the partner's behavioral transformation following the program's implementation.

Referring to the post-test recapitulation data presented in Figure 3, a significant transformation is evident in the partner's digital readiness profile after completing the series of community service activities. In stark contrast to the initial baseline conditions, the post-intervention data distribution demonstrates a positive escalation trend. The majority of the participants' responses shifted toward the upper quadrant, dominating the scales of 4 (Agree) and 5 (Strongly Agree). This statistical phenomenon indicates that the counseling and mentoring materials were successfully internalized and effectively enhanced the participants' knowledge and confidence in applying digital marketing strategies. Consequently, the initial skepticism and uncertainty were replaced by optimism, improved self-efficacy, and a more constructive understanding of the role of social media and e-commerce in business development. The findings also suggest that the intervention not only increased participants' theoretical comprehension but also strengthened their readiness to adopt digital platforms as practical tools for expanding market reach, improving customer engagement, and supporting the long-term sustainability of their business activities.

On a granular level, this score increase reflects the success of the intervention across two main dimensions: cognitive and effective. In the cognitive dimension, the respondents demonstrated a substantial improvement in their understanding of e-commerce operational mechanisms and content strategies. Meanwhile, in the affective dimension, the high frequency of maximum scores on confidence indicators, such as for Respondent 6 and Respondent 10, implies the growth of self-efficacy. This indicates the partner's confidence in managing their digital assets independently. The absence of extremely low scores on a scale of 1 in these results serves as empirical validation. It proves that this business incubation program was effective in

reducing both technical and psychological barriers while simultaneously enhancing the digital readiness of the Meruyung Fish Farm MSME to compete in a broader market (Malaya, 2023).

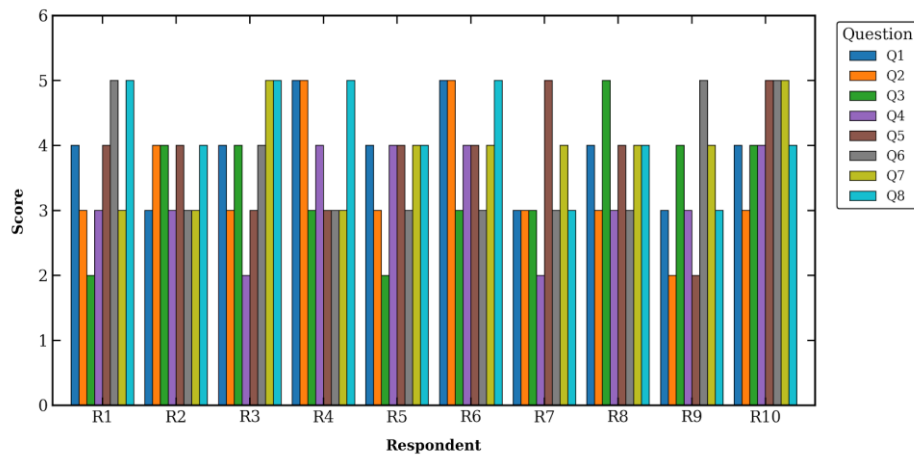


Figure 3. Post-test result

The evaluation of the program's effectiveness was further deepened through a comparative analysis of the mean values obtained from the pre-test and post-test stages. Based on the calculation of the mean difference, a positive and consistent trend shift was identified across all respondents. Empirically, this increase indicates that the provided educational intervention had a significant impact on reconstructing the partners' perceptions and understanding regarding the urgency of technology adoption (Chugh et al., 2023). Detailed quantitative data regarding this competence escalation is comprehensively mapped in Figure 4 below.

The analysis of the increase in mean values from the pre-test to the post-test stage indicates the program's success in improving digital literacy and fundamentally changing the partners' perceptions. The data shows that all respondents experienced a score increase, represented as a positive delta, with a range of changes between 1.25 and 2.125. The consistency of this increase for every individual confirms that the understanding of the material was absorbed holistically and was not concentrated among only a few individuals. However, there was a disparity in the magnitude of improvement for Respondent 1, who showed the lowest increase of 1.25. This can be scientifically explained because of the heterogeneity in absorption capacity and initial digital readiness. It is possible that this individual faced greater barriers to technology adaptation, such as age factors or minimal previous exposure to digital devices (Susanty et al., 2025).

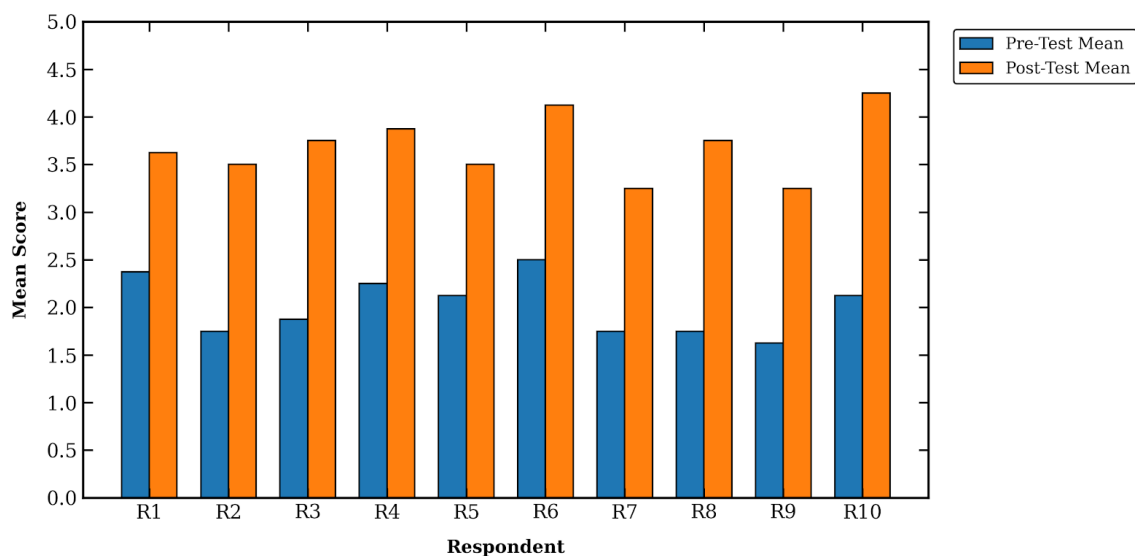


Figure 4. *Comparison of pre-test and post-test mean scores*

Furthermore, the community service team decided to utilize a parametric test, the paired t-test, to assess whether a change in perception occurred among the respondents. Parametric tests require data to follow a specific distribution, and the t-test specifically relies on a normal distribution. Consequently, the analysis of the mean difference was preceded by a normality test using the robust and widely used Shapiro-Wilk Test. This study used $\alpha = 0.05$ for both the normality test and the hypothesis test. Based on the results obtained from the normality test, a p-value of 0.92613 was recorded, which is well above the α value. Furthermore, the W-score obtained was 0.97411 (approaching 1), indicating that the null hypothesis holds true and the data follows a normal distribution. Given these results, the paired t-test analysis proceeded. Based on the paired t-test results, the significance of the community service program was evident. This finding aligns with the change in the mean data visualized previously. According to the hypothesis test results, a p-value of 1.12×10^{-8} was obtained, indicating that $p < 0.05$. These results are consistent with the T-score of 19.5228, which signifies that $T\text{-score} > T_{(0.95, 9)}$. From these results, it can be concluded that the community service program transformed the partners' perspective on viewing the digital market. The positive T-score indicates that the community service agenda successfully brought about behavioral changes, leading the partners to become open to learning about market opportunities and the utilization of e-commerce in the future (Singh & Liébana-Cabanillas, 2024).

As a preliminary step, the community service team and the partners began implementing sales on e-commerce platforms and striving to optimize market opportunities through product diversification. The first result emerging from the product diversification effort is Yellow Spiced Tilapia. In the future, the number of diversified products will increase to broaden the partners' competitive reach in the market (He, 2015). The community service team has attached a photograph of one example of the diversified product, specifically "Ikan Bumbu Kuning", in Figure 5.



Figure 5. *The community service team and partners performing the fish seasoning and sales process*

The positive results regarding the increase in digital readiness and e-commerce understanding among the Meruyung Fish Farm partners align with various previous publication findings that also focused on the digitalization of the livestock and fisheries sectors. For example, community service activities conducted by Hafid et al., (2026) showed that training in creating promotional media using the Canva application proved capable of independently improving the skills of a goat farming group. They progressed from not knowing the application to being able to operate it fully. The success of market expansion through digital platforms is

also supported by the findings of Ahmadi et al. (2021), who concluded that the utilization of marketplaces in white rat breeding businesses was very effective in expanding reach to new target consumers who were accustomed to shopping online. Furthermore, digital marketing-based empowerment for a quail egg farming community, evaluated by Sudiyono et al. (2025), demonstrated a surge in participant comprehension scores on the post-test, which directly implied a real increase in product sales volume. This comparison comprehensively confirms that intervention in the form of digital marketing education, combined with e-commerce adoption, is a crucial step that consistently provides a significant impact in optimizing market competitiveness for MSME actors (Sharabati et al., 2024)

CONCLUSION

The community service team conducted outreach regarding digital marketing and e-commerce utilization to expand the target market for the Meruyung Fish Farm MSME. The success of this initiative is demonstrated by the pre-test and post-test data, which show a positive shift in the partners' understanding of the material provided. Furthermore, the team processed the data using a paired t-test parametric hypothesis test. The team concluded that the statistical analysis clearly highlights the change in the partners' behavior, as they have become open to opportunities within the digital market. Following the outreach, the team and the partners collaborated on product diversification as a step toward market optimization. This diversification began with the creation of "Ikan Bumbu Kuning". Moving forward, the community service team and the Meruyung Fish Farm MSME will continue to develop and maintain the synergy and collaboration established since the beginning of this project.

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