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Analysis Of Artificial Intelligence (AI) Recommendation Systems To Support Itsuki Matcha As A Micro, Small, And Medium Enterprise (MSME) In Indonesian Social E-Commerce

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ABSTRACT

This study examines the implementation of artificial intelligence–based recommendation systems through Meta Ads and Odoo ERP in the micro, small, and medium enterprise (MSME) Itsuki Matcha. The research aims to evaluate how AI-driven digital advertising and operational systems contribute to brand awareness, customer interest, and sales performance. A mixed analytical approach was employed, combining the EPIC Model to assess advertising effectiveness with experimental budget variations in Meta Ads and operational evaluation of Odoo ERP. The findings indicate that communication-focused advertising content performs most effectively in attracting audience attention and conveying product information. While the Meta Ads recommendation system initially faced a cold-start condition, performance improved as the algorithm entered a learning phase, leading to higher engagement and the first recorded sales conversions. In addition, Odoo ERP enhanced operational efficiency by automating inventory management and synchronizing sales data, despite limitations in activating its AI recommendation features due to insufficient historical data. Overall, the study demonstrates that AI-based systems can support early-stage MSME growth by strengthening digital visibility and operational accuracy, although sustained implementation and longer observation periods are required to achieve stable financial performance and scalability.

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are vital global economic drivers, fostering employment and local growth despite asset limitations. However, they face persistent hurdles such as limited capital, low technological capability, and uneven digital readiness *(Sinuhaji & Ibrahim, 2024)*.

In Indonesia, MSMEs show remarkable resilience, growing to 66 million units in 2023, contributing 61.07% to GDP and absorbing 97% of employment (Direktorat Jenderal Perbendaharaan, 2023). This strategic role is further strengthened by strong government commitment through various policies and programs aimed at facilitating, protecting, and empowering MSMEs, including Government Regulation No. 7 of 2021 (Rezeki et al., 2025). Such efforts are complemented by broader national initiatives, such as the Koperasi Merah Putih program under Presidential Instruction No. 9 of 2025, which targets the establishment of 80,000 cooperatives to support the Indonesia Emas 2045 vision (Foureska, 2025).

The potential of MSMEs can be further optimized through Artificial Intelligence (AI). AI refers to computer systems capable of learning and reasoning to perform human-like tasks (Sobron, 2021). Economically, AI is projected to add USD 366 billion annually to Indonesia's GDP by 2030 (Snapcart, 2024). With generative AI adoption reaching 92% among Indonesian workers (ANTARA, 2025). AI is becoming increasingly relevant for both large firms and MSMEs.

A key AI application is the recommendation system, which analyses consumer behavior to provide personalized suggestions. For instance, Amazon's system generates 35% of its global sales (Agentive aiq, 2025). Similarly, platforms like Tokopedia use these systems to enhance relevance and customer loyalty (Haq et al., 2025).

In social commerce, where trust and community interaction drive decisions *(Busalim & Hussin, 2016)*, Indonesian MSMEs have begun utilizing data-driven tools. Digital marketing platforms have become an essential tool for MSMEs to overcome geographical limitations and expand their market reach to a broader audience (Vuspitasari et al., 2023). The AYO SRC application within the Sampoerna Retail Community (SRC), for example, provides inventory and promotional insights that significantly boost revenue and asset growth (Reza, 2024).

Despite these benefits, AI adoption among Indonesian MSMEs remains low at 38.7% (Siaran Pers, 2024). This limited adoption is largely driven by structural barriers such as low digital literacy, financial constraints, and poor data quality resulting from manual record-keeping practices. MSMEs lacking adequate digital skills tend to fail to capitalize on opportunities in the digital world, further exacerbating the digital divide and limiting the effective utilization of AI technologies (Nainggolan et al., 2025). These conditions underscore the urgent need for studies focusing on practical and scalable AI implementation in resource-constrained MSME contexts.

This study examines Itsuki Matcha, a micro-enterprise founded in August 2025 in the BSD, Gading Serpong, and Alam Sutera areas, as an experimental case. The research integrates digital marketing effectiveness via Meta Ads (evaluated using the EPIC Model) and operational digitalization through Odoo's AI-based recommendation features (Nurfitri Rosiana, 2025). By unifying these perspectives, this study evaluates how integrated AI-driven approaches can improve visibility, efficiency, and sales, offering a holistic framework for MSME growth and potential international expansion.

LITERATURE REVIEW

MSMEs are a cornerstone of Indonesia's economy, classified by Law No. 20 of 2008 based on assets and turnover (Rahmini, 2017). Government support, such as the Koperasi Merah Putih program, aims to bolster digital interaction and capital access for the Indonesia Emas 2045 vision (Foureska, 2025). Despite this, MSMEs still face structural hurdles in adopting advanced technologies.

Advertising is a vital tool for MSMEs to influence consumer behavior (Kotler & Armstrong, 2002 ;Jefkins, 1997). While the AIDA framework (Attention, Interest, Desire, Action) explains the sequential purchase process (Kotler & Keller, 2008), , it often fails to capture the qualitative nuances of digital media. Consequently, the EPIC Model (Empathy, Persuasion, Impact, and Communication) is used for a more holistic evaluation of advertising effectiveness in social media contexts (Durianto, 2003).

Social media has evolved into an interactive ecosystem for networking and digital marketplaces (Kaplan & Haenlein, 2010; Nasrullah, 2015). These platforms support various functions, including social networking, content sharing, microblogging, collaboration, and digital marketplaces (Qadir & Ramli, 2024). This enables data-driven online advertising that allows MSMEs to target specific audiences and optimize campaigns in real-time (Kurniawan, 2022; ConnexIndo, 2023). Central to this is Artificial Intelligence (AI), which mimics human intelligence to perform specific tasks like prediction and personalization (Yani, 2024). In practice, most AI applications in business operate under Artificial Narrow Intelligence (ANI), performing specific tasks such as personalization and prediction. AI systems leverage machine learning algorithms to process large volumes of data, enabling organizations to generate insights and automate decisions that exceed human cognitive capacity in speed and scale.(Yani, 2024).

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One of the most prominent AI applications in digital commerce is the AI-based recommendation system. Recommendation systems utilize big data analytics and machine learning algorithms to identify patterns in user behavior and generate personalized suggestions (Caballar & Stryker, 2024) These systems typically operate using content-based filtering, collaborative filtering, or hybrid approaches. Content-based filtering relies on product attributes and user preferences, while collaborative filtering leverages similarities among users' behaviors. Hybrid systems combine both approaches to improve accuracy and address issues such as the cold-start problem (Rayhan et al., 2024; Rachmaniar et al., 2025). Empirical studies consistently show that recommendation systems enhance user experience, engagement, and purchase likelihood, particularly in digital commerce environments.

Beyond marketing, AI-driven recommendation systems are increasingly embedded within Enterprise Resource Planning (ERP) systems to support operational efficiency. ERP systems evolved from early inventory-focused models such as MRP and MRP II into integrated platforms that unify core business functions through a centralized database (Robert Jacobs & Ted Weston, 2007). Modern ERP solutions, such as Odoo, extend this integration by incorporating AI-based features for inventory optimization, transaction recording, and demand forecasting. Prior studies indicate that ERP implementation in MSMEs can significantly reduce manual processes and improve operational efficiency, although most research focuses on functional integration rather than intelligent recommendation capabilities.

The convergence of AI, social media, and digital commerce has given rise to social e-commerce, which emphasizes socially mediated purchasing behavior. Social e-commerce leverages Web 2.0 technologies and social interactions, such as reviews, ratings, recommendations, and user-generated content, to influence purchase decisions (Busalim & Hussin, 2016). Unlike traditional e-commerce, social e-commerce relies on trust-building through social networks rather than static product catalogues. Its implementation spans various forms, including chat commerce, shoppable posts, livestream shopping, user-generated content selling, and interactive quizzes (Jayaraman, 2025). These mechanisms highlight the growing importance of recommendation-driven and socially contextualized digital marketing strategies.

Previous empirical studies have examined the effectiveness of Meta Ads, EPIC Model evaluations, ERP implementation using Odoo, and digital marketing impacts on MSME performance in isolation. Research on Odoo-based ERP implementation confirms improvements in operational efficiency (Hartono et al., 2024), while studies applying the EPIC Model demonstrate strong advertising effectiveness across its dimensions in MSME contexts (Nurfitri Rosiana, 2025). Other studies report significant improvements in brand awareness and revenue through Meta Ads and digital marketing strategies (Baihaqi & Widodo, 2025; Fahri, 2025). However, these studies largely treat marketing effectiveness, advertising evaluation, and operational digitalization as separate domains.

Accordingly, a clear research gap exists in the lack of integrated studies that examine AI-based recommendation systems holistically across both digital marketing and operational functions within MSMEs. This study addresses this gap by synthesizing social media advertising evaluation using the EPIC Model, AI-driven recommendation mechanisms within Meta Ads, and operational digitalization through Odoo ERP. By adopting an integrated framework, this research contributes to a deeper understanding of how AI-based recommendation systems can function as a unified strategic tool to enhance MSME visibility, efficiency, and sales performance.

METHODS

This study employed a field experimental approach to examine the effectiveness of digital marketing strategies and AI-based recommendation systems in supporting the performance of a micro, small, and medium-sized enterprise (MSME), namely Itsuki Matcha. The research was conducted in South Tangerang, specifically in BSD City, Gading Serpong, and Alam Sutera. These areas were selected due to their high level of digital technology adoption, dense population of young and productive consumers, and strong support from large-scale property developers and educational institutions, which together create an environment that is receptive to digital innovation and online marketing strategies.

Data collection was carried out between September 2025 and January 2026 through three main experimental components: advertising content evaluation using the EPIC Model, promotional budget experimentation using Meta Ads, and operational system implementation using the Odoo ERP platform. In the first stage, the effectiveness of advertising content was tested by developing four distinct video advertisements, each designed to represent one dimension of the EPIC Model: Empathy, Persuasion, Impact, and Communication. These advertisements were distributed separately through Meta Ads with identical budgets and time schedules to ensure objective performance comparison. Advertising performance was measured using key digital marketing indicators, including impressions, clicks, click-through rate (CTR), video plays at 75%, number of incoming messages, and cost per result.

Following the identification of the most effective EPIC dimension, the study proceeded with a promotional budget experiment using the best-performing advertisement. The experiment was conducted in several stages, starting from a baseline condition without paid promotion and continuing with gradual increases in daily advertising budgets. The effectiveness of each budget level was evaluated by comparing impressions as a proxy for brand awareness and revenue generated from customer transactions as an indicator of sales performance. In addition, Return on Advertising Spend (ROAS) was calculated to assess the efficiency of advertising expenditures in generating revenue.

The operational aspect of the study focused on evaluating the implementation of the Odoo ERP system as a digital operational support tool for MSMEs. A paid Odoo account was used to manage inventory records, sales transactions, and customer interactions, while also utilizing system-generated recommendations such as restock alerts. Operational data generated through Odoo were compared with previously used manual recording methods to assess improvements in efficiency, accuracy, and decision-making support. Through this integrated

methodological approach, the study enables a comprehensive evaluation of how digital advertising strategies and AI-based recommendation systems contribute to both marketing effectiveness and operational performance of MSMEs.

RESULTS

EPIC MODEL

This study presents empirical findings derived from three main stages of analysis, namely the evaluation of advertising effectiveness using the EPIC Model, promotional budget experimentation through Meta Ads, and operational performance assessment based on the implementation of the Odoo ERP system. The results are reported descriptively to reflect observable outcomes during the research period.

The first stage examined advertising effectiveness using four video advertisements, each designed to represent one dimension of the EPIC Model: Empathy, Persuasion, Impact, and Communication. All advertisements were distributed via Meta Ads using identical targeting parameters, campaign duration, and budget allocation to ensure comparability. The performance indicators analysed included impressions, clicks, click-through rate (CTR), number of results in the form of customer chats, cost per result, and video engagement levels.

The Empathy-based advertisement demonstrated relatively strong engagement in terms of audience attention, particularly reflected in its click-through rate and video viewing duration. However, despite positive engagement indicators, the conversion outcome in the form of customer inquiries remained limited.

Table 1 Comparison of Advertising Performance Based on EPIC Dimensions

No	Advertisement Type	Total Budget (Rp)	Total Expenses (Rp)	Impressions	Results	Clicks	CTR (%)	CPR (Rp)	Video Views >75%
1	Empathy-Based	210,000.00	176,928.00	1,232	1	69	5.60	176,928.00	59
2	Persuasion-Based	210,000.00	176,874.00	1,705	6	45	2.64	29,479.00	50
3	Impact-Based	210,000.00	178,542.00	1,964	13	71	3.62	13,734.00	60
4	Communication-Based	210,000.00	176,912.00	1,843	8	83	4.50	22,114.00	217

Source: Data Processed, 2025

In contrast, the Persuasion-based advertisement produced a higher number of customer responses compared to the Empathy-based content. Although the click-through rate was lower, the Persuasion approach showed improved efficiency in generating actionable outcomes, indicating its effectiveness in encouraging audience response.

The Impact-based advertisement yielded the strongest overall performance among all EPIC dimensions. This advertisement recorded the highest number of customer interactions and the lowest cost per result, suggesting superior effectiveness in transforming audience exposure into concrete engagement.

Meanwhile, the Communication-based advertisement showed balanced performance across reach, engagement, and conversion indicators. This advertisement achieved the highest level of video retention, indicating that message clarity and information delivery played a significant role in maintaining audience attention.

Following the EPIC Model evaluation, the Communication-based advertisement was selected for further promotional budget experimentation. This stage aimed to assess how different levels of advertising expenditure influenced campaign performance. The baseline condition, in which no advertising budget was allocated, showed minimal reach and no engagement or conversion outcomes.

Table 2. Comparison of Advertising Performance Across Budget Allocation Levels

No	Budget Allocation Level	Total Expenses (Rp)	Impressions	Results	Clicks	CTR (%)	CPR (Rp)	Revenue (Rp)	ROAS (%)	Video Views >75%
1	Moderate Budget	181,591.00	6,833	12	112	1.64	15,132.58	–	–	361
2	Increased Budget	357,528.00	5,582	12	176	3.15	29,794.00	–	–	328
3	Highest Budget	527,791.00	6,543	22	215	3.29	23,990.50	486,000.00	92	461

Source: Data Processed, 2025

When a moderate daily advertising budget was applied, the campaign experienced a substantial increase in impressions, clicks, and customer interactions. However, despite improved engagement metrics, this budget level did not yet generate measurable revenue outcomes.

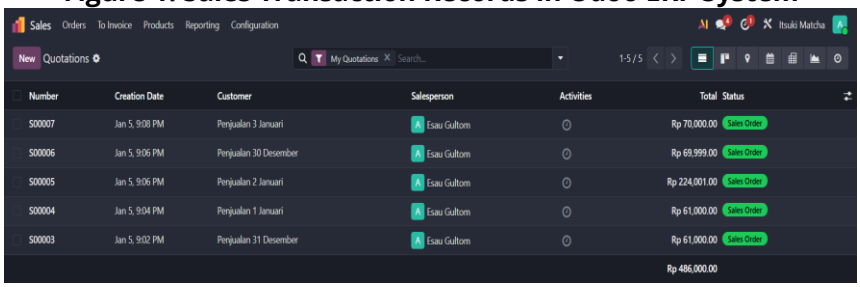
An increased advertising budget led to higher engagement efficiency, reflected in improved click-through rates and sustained customer responses. Nevertheless, cost efficiency varied, indicating that higher spending did not always correspond proportionally with improved conversion performance.

At the highest budget level tested, the campaign successfully converted advertising engagement into actual sales revenue. This stage recorded the highest number of customer interactions and marked the first instance of positive revenue generation, indicating a more effective translation of advertising exposure into purchasing behavior.

ODOO

The final stage of analysis focused on operational outcomes following the implementation of the Odoo ERP system. Sales transaction data recorded within the system confirmed the occurrence of validated sales orders that corresponded with the advertising campaign's highest budget phase.

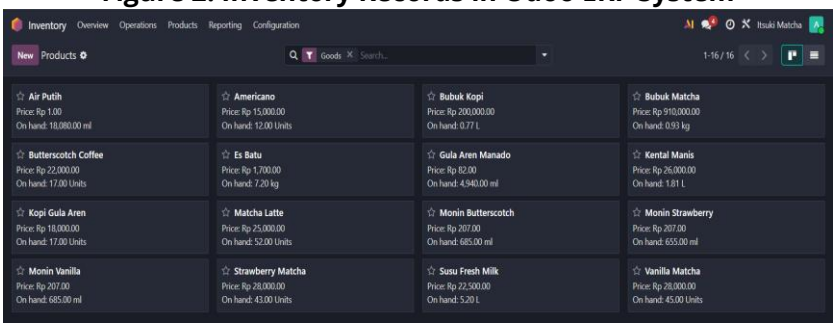
Figure 1. Sales Transaction Records in Odoo ERP System



Source: Screenshot of Itsuki Matcha Odoo ERP Dashboard (2025)

Based on the visual data presented, a total of five validated sales orders have been recorded in the Odoo system, with an aggregate transaction value of IDR 486,000. These five entries were documented on January 5, 2026, as a representation of the sales history of Itsuki Matcha. Subsequently, the data provided consists of the inventory catalogue of Itsuki Matcha, which has been registered within the Odoo ERP system. This catalogue includes product names, categories, and selling prices, serving as the informational basis for the system to identify the attributes of each item. The following illustration depicts the warehouse records of Itsuki Matcha as documented in Odoo.

Figure 2. Inventory Records in Odoo ERP System



Source: Screenshot of Itsuki Matcha Odoo ERP Dashboard (2025)

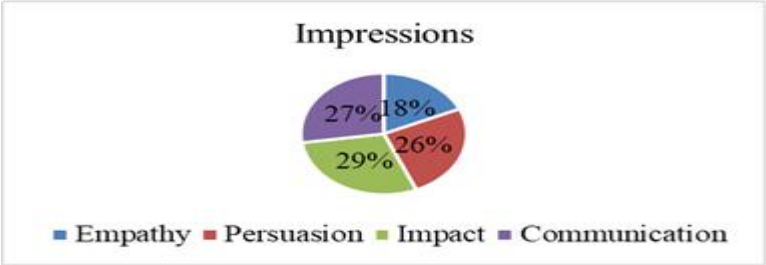
Based on the visual data presented, Odoo provides detailed information regarding the availability of Itsuki Matcha's raw materials. Effective raw material management is vital for production stability in F&B MSMEs, where the use of integrated systems can prevent stockouts and ensure operational efficiency (Gayatri & Wagini, 2020). The recorded stock includes 18,080.00 ml of water, 0.77 L of coffee, 0.93 kg of matcha powder, 7.20 kg of ice cubes, and 4,940.00 ml of Manado palm sugar. In addition, supporting ingredients are documented, consisting of 1.81 L of sweetened condensed milk, 5.20 L of fresh milk, as well as Monin syrup variants (Butterscotch, Strawberry, and Vanilla), each ranging between 655.00 ml and 685.00 ml.

From these remaining raw materials, the system converts and presents data indicating that the products available for sale are 43 units/cups of Strawberry Matcha, 43 units/cups of Vanilla Matcha, and 43 units/cups of Matcha Latte. For coffee-based variants, the system calculates that 17 units/cups of Palm Sugar Coffee, 17 units/cups of Butterscotch Coffee, and 12 units/cups of Americano remain available for sale. These figures demonstrate that the number of finished products ready for transaction in the sales module represents the system's computation based on the existing raw material inventory.

Brand Awareness (Epic Model)

Brand awareness in this experiment is measured using two primary indicators: impressions and video plays at 75%, which represent audience reach and content retention quality, respectively.

Figure 3 Impressions Comparison across EPIC Video Variations



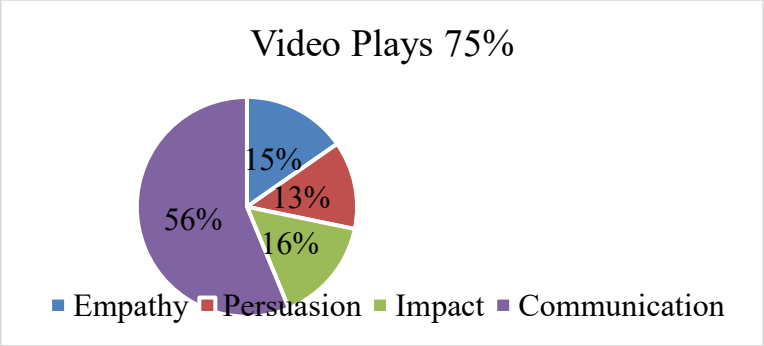
Source: Itsuki Matcha Meta Ads Manager Dashboard (2025)

The results indicate notable differences in audience reach across the four video formats, despite relatively similar advertising budgets allocated to each set. The impact video achieved the highest number of impressions, followed by the communication, persuasion, and empathy videos. This suggests that visually dynamic content combined with popular audio elements is more likely to capture initial audience attention and be favored by platform algorithms in terms of distribution.

From a temporal perspective, each video exhibited distinct daily performance patterns. The empathy video showed relatively stagnant impressions with an early peak followed by stabilization at lower levels. The persuasion video displayed a fluctuating pattern, peaking early, declining mid-period, and recovering slightly toward the end. The impact video demonstrated a positive upward trend, achieving its highest impressions near the end of the experimental period, while the communication video maintained a relatively consistent performance with a mid-period peak. These patterns highlight that algorithmic reach varies not only by content type but also by temporal audience responsiveness.

However, high impressions alone do not fully reflect effective brand awareness, as they do not capture how long viewers actually engage with the content. Therefore, video plays at 75% were analysed to assess retention and depth of audience attention.

Figure 4 Comparison of Video Plays at 75% across EPIC Video Variations



Source: Itsuki Matcha Meta Ads Manager Dashboard (2025)

The results reveal a substantial divergence between reach and retention. The communication video overwhelmingly outperformed the other formats, generating nearly four times more 75% video completions than the remaining videos. In contrast, the impact video, despite leading in impressions, produced relatively low retention, similar to the empathy video, while the persuasion video ranked lowest.

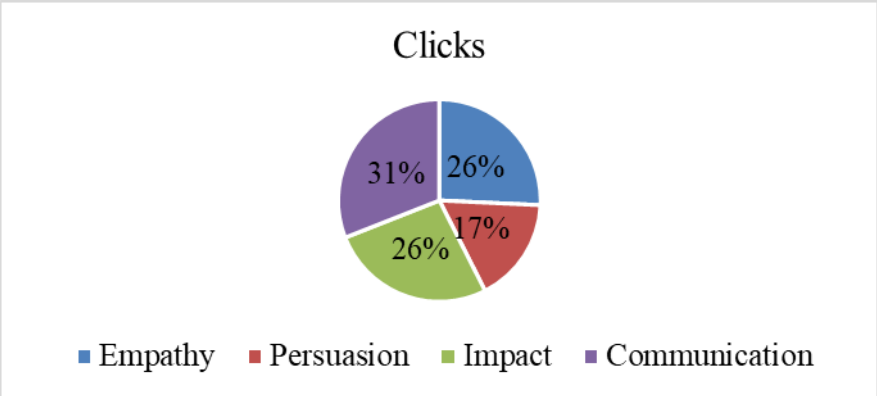
These findings demonstrate that initial attention and sustained engagement are driven by different content attributes. The impact video proved effective in attracting viewers at the beginning of the video but struggled to maintain their attention, indicating that visually appealing elements alone are insufficient to sustain interest. Conversely, the communication video successfully retained viewers due to its informative and structured narrative, which clearly explained the product, brand message, and value proposition of Itsuki Matcha.

Daily consistency further supports this conclusion, as the communication video maintained stable retention levels throughout the experiment, with consistently higher average daily completions compared to other formats. Overall, these results suggest that communication-oriented content is the most effective strategy for building brand awareness, as it balances algorithmic reach with meaningful audience engagement.

Customer Interest (Epic Model)

After examining audience reach and retention, the analysis proceeds to the customer interest stage, which reflects a deeper level of engagement beyond passive viewing. Customer interest is evaluated through the number of clicks on the embedded link directing viewers to Itsuki Matcha's WhatsApp contact, as this action represents an active response to the advertisement's call-to-action (CTA). A higher number of clicks indicates that the advertising message successfully stimulated curiosity and motivated viewers to seek further information.

Figure 5 Comparison of Clicks across EPIC Video Variations



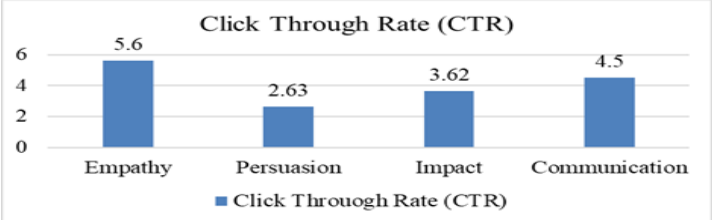
Source: Itsuki Matcha Meta Ads Manager Dashboard (2025)

The results show that the communication video once again achieved the strongest performance, generating the highest number of clicks among all video variations. This was followed by the impact and empathy videos, while the persuasion video consistently ranked lowest. These findings indicate that clear and informative messaging plays a critical role in encouraging viewers to take proactive steps after watching the advertisement.

A closer examination reveals meaningful differences in how each content strategy converts exposure into interest. The empathy video, despite having the lowest number of impressions, generated a relatively high number of clicks, nearly matching the impact video. This suggests that emotionally driven content can effectively convert a smaller audience into interested viewers by fostering personal connection. In contrast, the persuasion video demonstrated the weakest performance, indicating that explicit persuasive messaging may be less appealing and less capable of motivating action. The impact video, although dominant in impressions, showed lower efficiency in click generation, implying that visually attractive content alone may capture attention but does not necessarily translate into deeper interest. Meanwhile, the communication video exhibited superior performance, supported by its strong retention rate, suggesting that viewers who engage with informative content until later stages of the video are more likely to respond to the CTA.

To further assess the efficiency of audience interest generation, click-through rate (CTR) was analysed as a relative measure of clicks against impressions.

Figure 6 Comparison of Click-Through Rates (CTR) across EPIC Video Variations



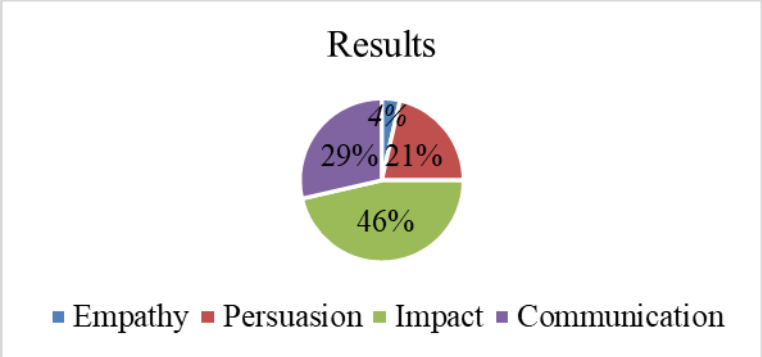
Source: Itsuki Matcha Meta Ads Manager Dashboard (2025)

The empathy video recorded the highest CTR, highlighting the strong relevance and engagement quality of emotionally driven content. Although its reach was limited, viewers exposed to this format demonstrated a higher likelihood of clicking, suggesting that narrative and emotional storytelling can establish a strong personal connection. The communication video achieved a balanced and relatively high CTR, reinforcing its effectiveness in combining informative content with audience relevance. Conversely, the impact video showed inefficiency in converting exposure into clicks, confirming that visually stimulating content may attract attention but lacks sufficient persuasive depth to encourage further action. The persuasion video recorded the lowest CTR, reinforcing the conclusion that overt persuasive approaches are less favored by audiences in this experimental context and result in missed interaction opportunities.

Cost Efficiency & Conversion (Epic Model)

The final stage in evaluating advertising performance focuses on conversion outcomes, measured through the number of incoming messages or chats (results). In this campaign, messages represent concrete actions taken by viewers after clicking the embedded link, indicating a transition from interest to transactional intent. These interactions may lead to further negotiation and, ultimately, sales.

Figure 7 Distribution of Conversion Results across EPIC Video Variations



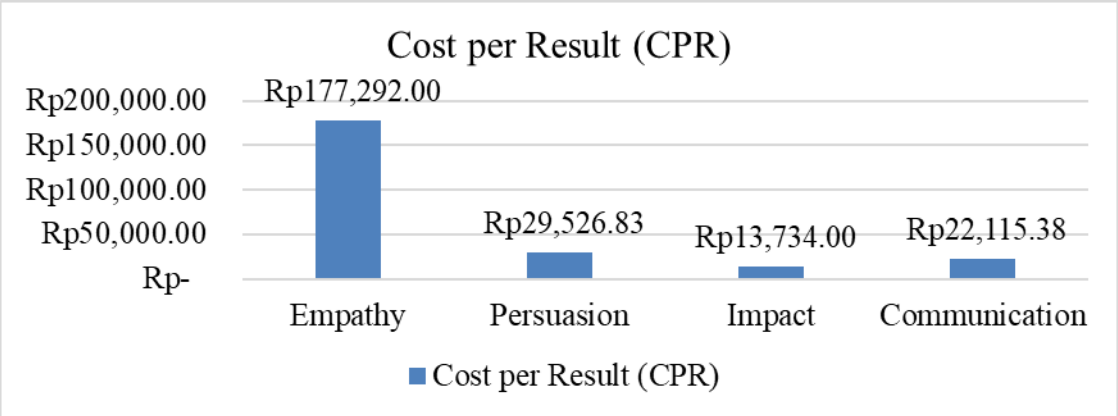
Source: Itsuki Matcha Meta Ads Manager Dashboard (2025)

The results indicate that the impact video achieved the highest number of conversions, accounting for nearly half of total incoming messages during the experimental period. The communication video followed as the second-best performer, while the persuasion video generated a moderate number of messages. In contrast, the empathy video produced the lowest conversion outcome.

When compared with earlier engagement metrics, these findings reveal several noteworthy patterns. Although the empathy video demonstrated strong performance at the interest stage, reflected by a high CTR, it failed to convert this interest into actual messages, suggesting that emotional engagement alone may not be sufficient to trigger final action. Conversely, the persuasion video presents an unusual case: despite having the lowest CTR, it generated more conversions than the empathy video, indicating that a smaller but more decisive audience segment may have been reached. The impact video, while not leading in CTR, proved highly effective in encouraging viewers to complete the final action, implying that audiences attracted by visually striking content tend to have stronger purchase intent. Meanwhile, the communication video exhibited the most stable performance, making it the safest and most consistent option for sustained campaigns.

To evaluate economic efficiency, cost per result (CPR) was employed as the primary indicator, calculated by dividing total advertising expenditure by the number of conversion results.

Figure 8 Comparison of Cost per Result (CPR) across EPIC Video Variations



Source: Itsuki Matcha Meta Ads Manager Dashboard (2025)

The findings show substantial differences in budget efficiency among video types. The empathy video recorded extremely poor cost efficiency, as minimal conversions resulted in a very high CPR, rendering it economically unviable. The persuasion video achieved moderate efficiency, performing better than empathy but remaining less optimal compared to other strategies. The impact video emerged as the most cost-efficient variation, achieving the lowest CPR and demonstrating strong economic sustainability for business-scale advertising. The communication video ranked second in efficiency and, despite not being the cheapest, offered the most stable daily performance. This balance between cost control and consistency positions the communication video as the most reliable and strategically safe option for advertising Itsuki Matcha.

EPIC Model Conclusion

Based on the EPIC Model analysis, the communication dimension emerged as the most effective. The communication-based video showed the most stable influence on audience attention, engagement, and conversion, indicating that viewers clearly understood the message, visuals, and product information of Itsuki Matcha. Clear message delivery enabled the product value to be communicated effectively without causing confusion.

This finding aligns with previous research by Durianto (2003), which emphasized that the communication dimension consistently delivers superior performance in advertising effectiveness. Both the present study and earlier findings highlight that message clarity plays a crucial role in ensuring successful information transfer to the target market.

However, this study also presents results that differ from Durianto's (2003) conclusions regarding the weakest performing dimension. While prior research positioned the impact dimension as the least effective, the current findings show that impact-based content performed positively, ranking as the second most effective dimension. Conversely, the empathy and persuasion dimensions demonstrated weaker performance. Specifically, empathy emerged as the least efficient dimension in terms of cost effectiveness, while persuasion showed the lowest performance in enhancing brand awareness for Itsuki Matcha.

DISCUSSION

Brand Awareness Analysis

The budget experiment reveals that advertising expenditure is critical for shaping brand awareness through interaction with recommendation algorithms. Without a budget, brand exposure deteriorated rapidly as organic distribution is highly constrained by content novelty (Thorgren et al., 2024). Introducing a modest budget reactivated visibility, though the system

initially faced a "cold start" condition, where a lack of historical data limited targeting precision (Brasoveanu et al., 2020). During this phase, the algorithm prioritized broad exploration over engagement quality to collect behavioral signals (Ye et al., 2023)**.**

As the budget increased, the system shifted from quantity-driven exposure to quality-driven engagement. Despite lower total impressions at the mid-budget stage, deep video engagement (75% duration) increased, suggesting a "positive carryover effect" where repeated exposure fosters familiarity (Archak et al., n.d.). This is vital for new brands like Itsuki Matcha, as trust formation requires consistent exposure (Sitanggang et al., 2024). At the highest budget, the algorithm reached an optimization phase, delivering content to highly relevant audiences. These findings confirm that incremental budgets enhance awareness quality by enabling algorithmic learning and audience refinement.

Cost Efficiency Analysis

Customer interest, measured via click-through rate (CTR), followed a gradual progression aligned with algorithmic learning. Initially, interest remained low (CTR <2%) despite high impressions. This reinforces the "cold start" theory, where the system lacks data to predict click probability, thus prioritizing broad data collection over engagement (Ye et al., 2023; GCG Media, 2025).

A significant improvement in customer interest occurred when the advertising budget reached a moderate level, marked by a sharp increase in CTR above the 3% average threshold. This improvement resulted from more precise audience targeting as the recommendation system accumulated interaction data, as well as repeated ad exposure that increased familiarity and trust. This pattern reflects a positive carryover effect, in which prior exposure enhances the effectiveness of subsequent advertising efforts (Archak et al., n.d.), Audiences who initially engaged passively were more inclined to click upon repeated encounters with the brand, indicating a progression from awareness to interest.

The importance of repetition in cultivating customer interest is further supported by Sitanggang et al. (2024), who emphasize that trust-building requires sustained exposure before audiences are willing to take action. In this context, repeated advertising did not merely reinforce brand recall, but actively lowered psychological barriers associated with clicking and information seeking. This suggests that customer interest is not an instantaneous outcome of advertising exposure, but rather the result of cumulative interactions over time.

At the highest budget level, customer interest stabilized at a consistently high level, with CTR remaining above 3% and generating the highest number of clicks. This pattern indicates that interest in Itsuki Matcha reflected genuine market demand rather than a temporary visibility effect. At this stage, the recommendation algorithm had shifted from exploration to optimization, targeting users with a proven tendency to engage. Overall, the results confirm that customer interest develops through a sequential process involving algorithmic learning, repeated exposure, and trust formation, which gradually converts passive viewers into active potential customers.

Sales Performance And Return On Advertising Spend (Roas) Analysis

The final stage of the budget experiment focuses on sales performance, as reflected through revenue generation and Return on Advertising Spend (ROAS). Notably, across the entire experimental sequence, measurable sales outcomes emerged only at the highest budget level. At this stage, Itsuki Matcha recorded its first real monetary conversion, generating a total revenue of Rp 486,000. Although daily observations indicate that sales did not occur consistently throughout the period, and the resulting ROAS of 92% suggests that the campaign had not yet reached the break-even point, the emergence of actual sales represents a critical milestone that was absent in all previous stages.

This conversion outcome serves as empirical validation of the carryover effect, whereby repeated exposure to advertising messages enhances the likelihood of eventual purchase decisions (Archak et al., 2012)**,** Audiences were repeatedly exposed to the same video across multiple budget stages, from lower to higher spending levels. As a result, some viewers likely interacted with the advertisement without immediately purchasing. Over time, sustained exposure reduced hesitation and supported the shift from consideration to actual purchase behavior.

Trust formation also plays a central role in explaining the emergence of sales at this stage. Sitanggang et al. (2024). aemphasize that for Generation Z audiences, repeated exposure to social media content is particularly effective in building familiarity and credibility. As a newly established brand, Itsuki Matcha required consistent advertising frequency to overcome initial uncertainty and skepticism. This underscores the fact that while product innovation is a primary driver for financial performance, the effectiveness of social media can vary; thus, implementing advanced systems like AI-based recommendations is crucial to optimize its impact on business outcomes (Marietza & Simbolon, 2021). Consequently, even though ROAS had not yet reached a profitable threshold, the recorded sales indicate that the advertising system had successfully transformed accumulated behavioral data into tangible economic value.

From a technical perspective, improvements in ROAS are not solely attributable to audience behavior, but also to the maturation of the recommendation algorithm itself. As advertising data accumulated, Meta Ads' AI system gained sufficient historical interaction signals to enhance targeting accuracy. This process reflects a transition from the learning phase observed at lower budget levels (GCG Media, 2025) toward a more exploitative phase, in which the system prioritizes audiences with higher conversion potential rather than maximizing exposure volume.

At the highest budget level, the recommendation system demonstrated a higher degree of data maturity, allowing it to allocate impressions more efficiently. Advertisements were increasingly delivered to users who had already exhibited strong indicators of interest and purchase intent during earlier stages. This shift reduced wasted impressions on passive viewers and concentrated distribution on high-quality segments. The occurrence of sales at this stage confirms that the combination of sufficient data accumulation and consistent daily advertising frequency is essential for overcoming consumer purchase barriers. Overall, these findings indicate that the effectiveness of AI-driven advertising systems improves progressively as the volume and quality of behavioral data increase, ultimately enabling the conversion of attention into sales outcomes.

Odoo Analysis

The Odoo experiment demonstrates that Itsuki Matcha has successfully begun recording integrated sales and inventory data within the ERP system. However, the AI-based recommendation feature embedded in the sales module was not yet activated. Similar to the Meta Ads experiment, this limitation can be attributed to the cold start problem (Brasoveanu et al., 2020), as the volume of transactional data collected by Odoo remains insufficient. With only five recorded sales, the system lacks the historical patterns required for the AI engine to learn customer purchasing behavior and generate meaningful product recommendations. As a result, the recommendation system was unable to operate effectively under the current data conditions.

Despite the inactivity of the AI recommendation feature, the operational implementation of the Odoo ERP system at Itsuki Matcha can be considered effective from a business process perspective. This finding aligns with Azrul et al., (2025) who argue that Odoo significantly supports micro, small, and medium enterprises (MSMEs) by enabling integrated management of sales and inventory. In the case of Itsuki Matcha, inventory data indicate that each recorded transaction automatically triggered a corresponding reduction in raw material stock levels. For

instance, remaining inventory levels such as 18,080 ml of water and 0.93 kg of matcha powder reflect system-generated calculations following recorded sales transactions. Odoo's automated sales–inventory synchronization provides accurate, real-time data, reducing manual errors and improving operational efficiency and decision-making. Although the AI recommendation feature remains limited by data availability, the ERP system has proven effective in strengthening operational control at Itsuki Matcha.

CONCLUSION

This study investigates the implementation of AI-based recommendation systems through Meta Ads and Odoo ERP in the MSME Itsuki Matcha. The findings indicate that artificial intelligence, when applied to both digital marketing and operational management, can support early-stage business growth by enhancing brand awareness, improving audience engagement, and enabling initial sales conversions.

The evaluation using the EPIC Model reveals that the communication dimension is the most influential factor in driving consumer response. Advertising content that clearly communicates product information and value propositions proved more effective in generating interest and purchase intention than content focused solely on visual appeal. This finding supports the work of Durianto (2003)**,** which emphasizes that effective communication is central to advertising success. Accordingly, MSMEs seeking measurable sales outcomes should prioritize message clarity and relevance in their digital advertising strategies.

Furthermore, the Meta Ads experiment demonstrates that AI-driven recommendation systems can progressively improve advertising performance. Although the system initially faced a cold start condition resulting in broad and less precise targeting (Brasoveanu et al., 2020), the algorithm gradually entered a learning phase that enabled more accurate audience segmentation (GCG Media, 2025). This progression was reflected in improved engagement metrics and the emergence of actual sales conversions. Repeated exposure to advertising content also played a critical role in building consumer trust toward a new brand, consistent with findings by Sitanggang et al. (2024). These results indicate that the effectiveness of AI-based advertising depends on both algorithmic learning and consistent campaign execution.

The implementation of Odoo ERP improved inventory efficiency at Itsuki Matcha by automating stock and sales synchronization, despite the AI recommendation feature not being fully functional. However, the business is not yet ready for international expansion, as increased brand awareness and initial sales have not translated into sustainable performance, making global expansion a long-term objective.

LIMITATION

This study has several limitations that should be considered when interpreting the results. The primary limitation is the relatively short experimental period and limited volume of historical data, which constrained the performance of AI-based recommendation systems in both Meta Ads and Odoo. This limitation affected the system's ability to optimize targeting accuracy and activate advanced recommendation features. However, this issue reflects a data maturity constraint rather than a methodological or measurement error.

Additionally, the research is based on a single MSME case study, which limits the generalizability of the findings to other industries or business contexts. Differences in product type, market characteristics, and consumer behavior may lead to different outcomes when implementing similar AI systems. Future studies are encouraged to include multiple MSMEs or conduct comparative analyses across sectors to enhance external validity.

Finally, this study focuses primarily on short-term performance indicators such as impressions, engagement metrics, and initial sales conversions. As a result, the long-term impact

of AI-based recommendation systems on customer loyalty, repeat purchases, and profitability could not be fully assessed. Future research should adopt a longitudinal approach to examine the sustainability of AI-driven marketing and operational strategies over time.

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