DESIGNING AUTONOMOUS AI FOR CONTENT CREATION FOR MSMEs

Fajria FATMASARI[1*], Aji Kresno MURTI[2], Deri Uli Cipto PRASETYO[3]
[1,2]Department of Marketing Management for Electronics Industry, Politeknik APP Jakarta
[3]Agency for Industrial Human Resources, Ministry of Industry
Email corresponding author: fajria.fatmasari@poltekapp.ac.id

ABSTRACT

Social media content plays a critical role in driving retail sales, yet many small and medium fashion enterprises still rely on manual content production, which is costly and time-consuming. Pand's Semarang, a fashion retailer targeting Muslim consumers, spent up to IDR 40 million per month on a four-person marketing communication team, yet still faced irregular posting schedules, low content variety, and a low Instagram engagement rate of only 0.1%. This study aims to design and evaluate an autonomous artificial intelligence (AI) platform for content creation at Pand's Semarang. Using a qualitative, descriptive-verificative approach combined with the waterfall software development method, the platform integrates ChatGPT and Freepik through engineered prompts to automatically generate content ideas, narratives, illustrative images, and an upload schedule linked to a content calendar. Testing shows that a single employee can produce multiple pieces of content in under 30 minutes. Evaluation results indicate 87% alignment between AI-generated content ideas and user preferences, narratives fully consistent with their titles, and a 70% suitability rate for AI-generated images. These findings suggest that autonomous AI can substantially improve content production efficiency for small and medium fashion retailers, although further refinement of prompt engineering and periodic system updates are still required.

Keywords: Artificial Intelligence, Digital Marketing, Content Creation, Prompt Engineering, Fashion Retail

1. INTRODUCTION

Indonesia is home to the world's largest Muslim population—207 million people, or 12.7% of the global total—creating substantial market opportunity for Muslim fashion apparel such as clothing, hijabs, and related accessories. Reflecting broader shifts in Indonesian consumer behavior, industry research shows that the share of consumers shopping exclusively online rose from 11% before the COVID-19 pandemic to 25.5% in early 2021, while data from the Indonesian Internet Service Providers Association (APJII) indicates that national internet penetration has grown by roughly 10% annually. Fashion and accessories consistently rank among the top-selling product categories online (Hootsuite & We Are Social, 2022), a pattern that extends to Muslim fashion specifically, where online purchasing of Islamic clothing accelerated markedly during and after the COVID-19 crisis (Salim et al., 2022).

For fashion retailers, this shift has made social media content a decisive factor in driving sales. For example, Pand's Semarang, a local Muslim fashion retailer with outlets in Semarang and Yogyakarta, promotes its products primarily through Instagram (@pandsmds). However, the company's digital marketing has faced several persistent challenges: inconsistent posting schedules, repetitive, unappealing content, and poorly organized posting ideas. These issues are reflected in a low engagement rate of just 0.1%. To address them, Pand's Semarang employs a four-person marketing communication team dedicated to graphic design, content planning, video editing, and digital marketing research, at a cost of roughly IDR 40 million per month—yet the resulting content still frequently deviates from the company's intended marketing strategy in terms of design execution, posting time, and overall quality. From the observations, it was revealed that many MSMEs have the same problems as the prior SMEs mentioned.

Artificial intelligence (AI) offers a promising solution to this class of problem. AI refers to computer systems designed to emulate human thought processes and behavior, and has increasingly been shown to enhance marketing processes and reshape how firms create and deliver value to consumers (Labib, 2024; Peltier et al., 2024). Publicly accessible generative AI tools—such as ChatGPT, Copy.ai, and various AI image generators—have proliferated rapidly in recent years, offering opportunities to reduce both the time and cost of content production. However, few small and medium enterprises apply AI systematically to their digital marketing operations, partly because limited technical expertise and financial resources remain persistent barriers to adoption (Bhalerao et al., 2022).

Building on these considerations, this study designs and evaluates an autonomous AI platform for content creation for MSMEs. The research addresses two questions: (1) how should an autonomous AI application be designed for MSMEs, and (2) how well does the content produced by this application align with user expectations? The study aims to describe the design of this AI-based content application and to assess the level of alignment between AI-generated

content and user needs, with expected outputs comprising a working AI platform, intellectual property rights, and an international journal publication.

Despite the growing availability of generative AI tools, most existing studies on AI-assisted marketing focus on large enterprises or on platform-level social media analytics rather than on small and medium fashion retailers that lack dedicated technology teams (Saefudin et al., 2023). Likewise, prior research on Muslim fashion marketing has concentrated on how halal lifestyle, Islamic branding, and social media exposure influence consumer purchasing decisions (Romadhon, 2023), rather than on how such retailers can practically produce that content in the first place. Few, if any, studies provide a concrete, deployable design for integrating multiple AI services into a single content-production workflow tailored to a retailer's product segmentation and religious-market positioning. This study addresses that gap, offering a reference model that other small and medium fashion enterprises can adapt. The remainder of this paper is organized as follows: Section 2 describes the research method; Section 3 presents the platform's design, implementation, and evaluation results with a discussion of their implications; and Section 4 concludes with recommendations for future development.

2. METHOD

This applied study adopts a qualitative, descriptive-verificative approach appropriate for examining management-related phenomena, using a dummy of MSMEs, Pand's Semarang, a local fashion retailer, as the case for platform design and testing. The AI platform itself was developed using the waterfall model, a linear and sequential software development method comprising six stages: (1) software requirements analysis, to determine the scope of the platform through a feasibility analysis; (2) software design, covering database modeling, system architecture, and interface prototyping; (3) software development, involving implementation and unit testing; (4) software testing, including system testing and bug fixing; (5) software deployment (go-live), verified through user acceptance testing; and (6) software maintenance, encompassing impact analysis and continuous improvement.

Data were collected through three complementary techniques: (1) semi-structured interviews with MSMEs marketing communication team and management to identify content-related pain points and functional requirements; (2) direct observation of the existing manual content-production workflow, including its time and cost profile; and (3) a documentation study of the company's historical social media performance, including posting frequency and engagement metrics. Data were analyzed descriptively by comparing platform-generated outputs against the requirements established during the requirements-analysis stage, and by computing percentage-based alignment scores between AI-generated outputs (titles, narratives, and images) and the specifications provided by company informants. System testing combined black-box testing to verify that each platform function- login, content generation, scheduling, and calendar management- operated according to specification, with user acceptance testing (UAT), in which the marketing communication team used the platform under real working conditions and rated the suitability of its outputs. The evaluation results reported in Section 3 reflect this real-world UAT rather than a controlled laboratory test.

As illustrated in Figure 1, the platform was designed to connect multiple AI services to a central research/processing engine, which converts company-supplied keywords into a complete, ready-to-publish content package—covering graphics, captions, audio, and video—for distribution across the client's social media channels. To use the platform, the company enters a content concept or set of keywords into a designated input field. The system then processes these keywords through the integrated AI models to generate an appropriate visual (photo or animation) together with a matching caption and hashtags. The resulting content is subsequently scheduled through a built-in content calendar and, once approved, can be uploaded simultaneously across multiple social media accounts, such as Instagram and Facebook. All generated content is retained in the platform as a searchable content bank for future reuse or modification, with an average content-creation lead time of approximately one hour. The finished platform was evaluated jointly with Pand's Semarang marketing communication team against five criteria: conceptual alignment, brand identity consistency, graphic quality, narrative quality, and scheduling accuracy.

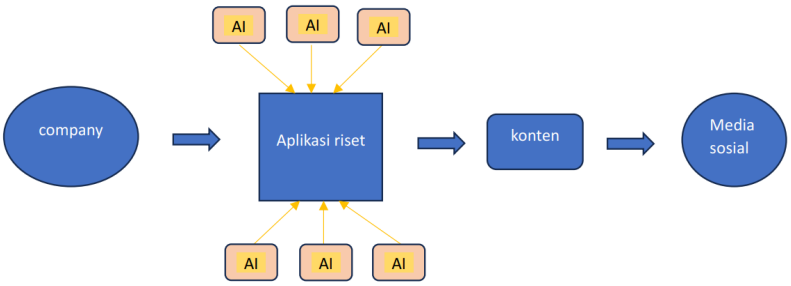

Figure 1. Conceptual design of the autonomous AI content-creation platform

3. RESULTS AND DISCUSSION

Platform Development

Development proceeded through three main stages: brainstorming, development, and testing. During the brainstorming stage, discussions with company stakeholders, developers, and the research team identified four core requirements: the platform must (1) accommodate content needs over a defined time horizon, (2) be user-friendly and up to date, (3) allow further editing of generated content, and (4) produce content that includes both visual and narrative elements. The development stage, which consumed the largest share of project time, translated these requirements into a working system, followed by usability testing with the company's marketing administrator.

The resulting platform, accessible at www.pands-ai.id, was built for the company's marketing admin and secured with individual login credentials (Figure 2).

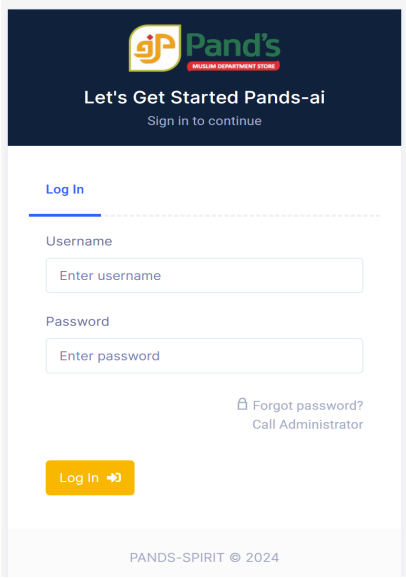

Figure 2. Login page of the Pand's-AI platform

AI Model Selection

Before finalizing the platform's AI components, the research team screened 120 publicly available AI applications spanning image generation, text and copy generation, background removal, and image enhancement, evaluating each against two criteria: the ability to generate content titles appropriate to the brief, and the ability to produce visually suitable supporting images. Table 1 summarizes a representative subset of the image-generation tools reviewed, illustrating trade-offs commonly encountered across the candidate pool—such as limited daily prompt quotas, visible watermarks, restrictive credit-based pricing, or outputs that diverged from the intended prompt.

Table 1. Sample of AI image-generation tools reviewed

AI tool	*Function*	*Limitation*	*Access*
Gencraft AI	Generates images, characters, and objects from text prompts	Limited to 10 prompts per day; visible watermark	Freemium
Adobe Firefly (Beta)	Generates and edits images with selective in-painting	Requires precise prompts; watermark on free tier	Free

AI tool	***Function***	***Limitation***	***Access***
LetsEnhance.io	Enhances and upscales low-resolution images	Enhancement quality drops on heavily degraded sources	Free
Fotor	Removes and replaces image backgrounds via prompts	Needs detailed prompts; credit-based generation is costly	Freemium
Ai. Nero	AI art generation, image upscaling, face restoration	Limited to 5 credits per day; small text becomes blurred	Freemium
Remodeled AI	Generates styled room/product mockups from templates	No custom prompts; limited to preset templates	Freemium

Following this review, ChatGPT was selected for narrative and idea generation for its consistent adherence to structured prompts, and Freepik was selected for image generation for its balance of output quality, licensing terms, and integration flexibility.

Content Segmentation and Prompt Structure

To ensure that AI outputs matched the company's target market, the research team first mapped Pand's Semarang's product catalog into a three-level segmentation taxonomy, by consumer segment (men, women, and children), product category (clothing, food, and, for the women's segment, cosmetics), and specific item (e.g., koko shirts, sarongs, ihram garments, prayer mats, dates, and Arabian coffee). This taxonomy underpins the guided dropdown and checkbox menus described below: when a user selects a segment and category, the platform narrows the available item choices accordingly, ensuring that the resulting prompt sent to ChatGPT and Freepik reflects a valid, brand-consistent combination rather than a free-text description prone to ambiguity.

Content Calendar and Prompt Engineering

A content calendar spanning 1 January to 31 December 2025 was developed jointly with the company, aligning content themes with both national holidays and Islamic religious observances. Rather than requiring users to write free-form prompts—which tend to produce generic results when instructions are not specific—the system compiles selections made through the guided menus above into a well-formed prompt before submitting it to the AI model. Two content-setup modes are available: daily content setup and special-occasion setup, both following the same underlying prompt-construction procedure (Figure 4).

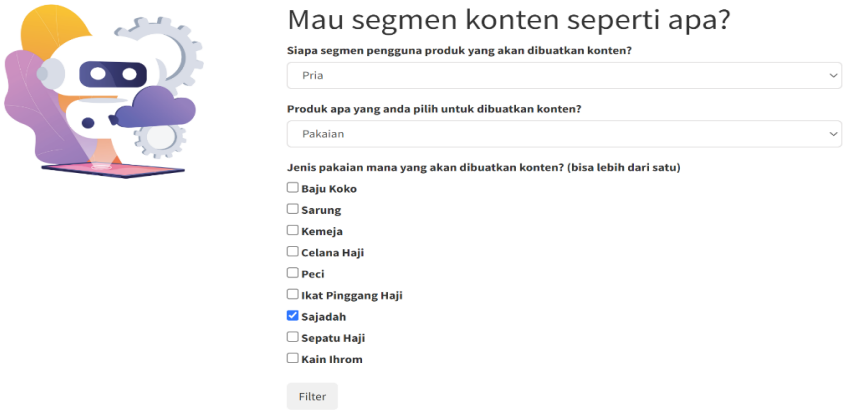

Figure 4. Guided prompt-engineering interface for content setup

To further contextualize content themes, the platform integrates a public holiday API, which automatically retrieves national holidays and Islamic observances and feeds them into the content calendar as suggested themes for upcoming posts (Figure 5).

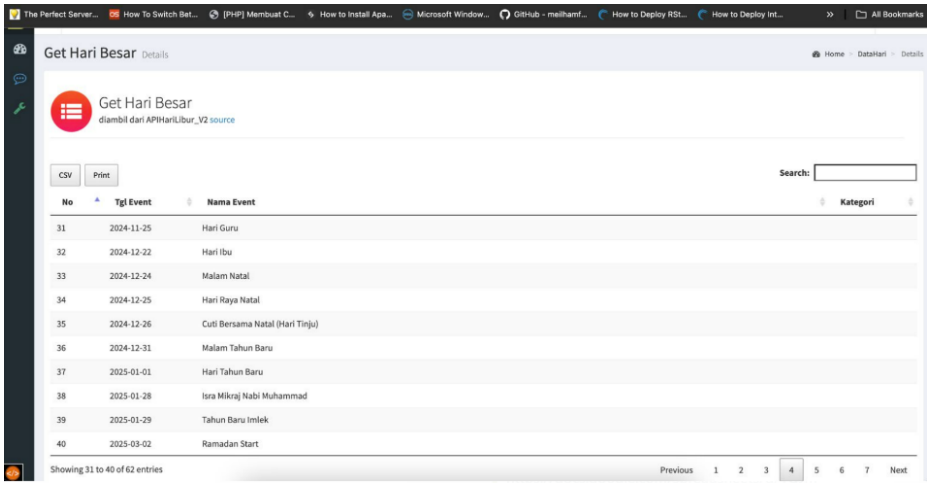

Figure 5. Automated retrieval of national and religious observance dates via API integration

Once a batch of content titles is generated and approved, the platform produces a complete narrative for each title, together with a recommended social media platform (e.g., Instagram or TikTok). Approved drafts are automatically saved to the content calendar, where their status indicator changes from red to green, and can subsequently be paired with company-supplied or AI-generated images before scheduled publication (Figure 6).

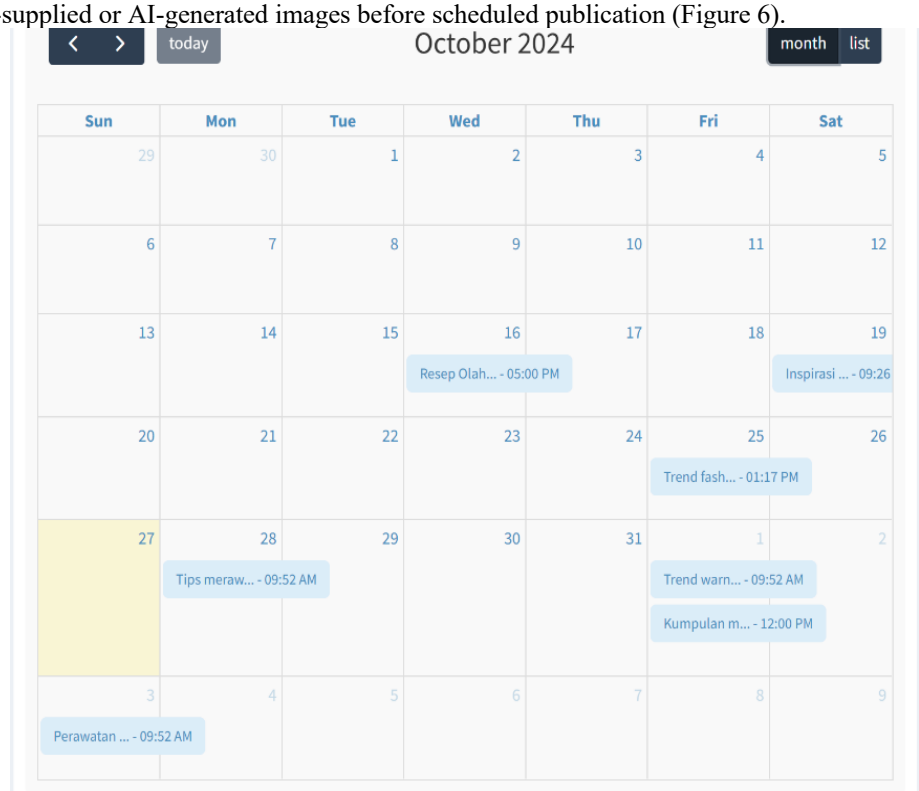

Figure 6. Content calendar populated with approved content

Evaluation Results

System testing over a defined trial period produced the results summarized in Table 2.

Table 2. Evaluation results of the AI content-creation platform

Evaluation criterion	***Result***
Alignment between generated titles and user expectations	87%
Consistency between AI-generated narrative and content title	100%

Evaluation criterion	***Result***
Alignment between AI-generated images and content title	70%
Average content-creation time (per employee)	< 30 minutes

Cost and Time Efficiency Comparison

To contextualize these results, Table 3 compares the company's content-production workflow before and after adopting the AI platform. Prior to implementation, Pand's Semarang relied on a four-person marketing communication team producing content largely by hand, at a monthly cost of approximately IDR 40 million, with inconsistent posting schedules and an Instagram engagement rate of only 0.1%. Following implementation, a single employee using the AI platform can produce multiple pieces of content in under 30 minutes per batch, substantially reducing both the staffing requirement and the recurring cost associated with manual content production, while also standardizing posting schedules through the integrated content calendar. Because full-scale deployment was still in progress at the time of writing, the resulting change in engagement rate had not yet been measured and is earmarked for a subsequent evaluation phase.

Table 3. Content-production workflow before and after AI platform adoption

Aspect	***Before (manual process)***	***After (AI platform)***
Team size	4 dedicated staff	1 staff, part-time use
Monthly cost	≈ IDR 40,000,000	Substantially reduced (platform subscription plus minimal staff time)
Content-creation time	Multi-day production cycle	< 30 minutes per batch
Posting schedule	Irregular	Standardized via automated content calendar
Instagram engagement rate	0.1%	To be monitored following full-scale deployment

These results indicate that the platform enabled a single employee to generate multiple pieces of content in under 30 minutes—a substantial efficiency gain relative to the company's previous four-person, IDR 40-million-per-month content workflow. Consistent with Saefudin et al. (2023), who found that AI-based social media analysis platforms can reduce marketing costs by optimizing resource use and avoiding unnecessary expenditure, this efficiency gain reflects AI's capacity to streamline both time and cost in digital marketing operations while also supporting faster decision-making. The comparatively lower suitability score for AI-generated images (70%) suggests that image generation remains the weakest link in the pipeline, likely reflecting the greater difficulty of translating abstract prompts into visually precise outputs compared with text generation. This finding points to prompt refinement particularly more detailed and context-specific image prompts—as a priority for further development.

More broadly, the platform illustrates several practical applications of AI in digital marketing: scheduling content around key dates, generating content ideas, drafting narratives, producing illustrative images, and recommending optimal upload times. Because the underlying prompt-engineering logic can be customized for other companies, the platform is inherently duplicable, consistent with Lubis's (2021) observation that AI systems tend to be easier, cheaper, and more reproducible than manual, human-dependent processes, while also allowing users to document and reuse outputs at any time. This is also consistent with Rajaram and Tinguely (2024), who argue that generative AI can democratize scalability and creativity for SMEs with limited technical expertise or financial resources.

This study is nonetheless subject to several limitations. The evaluation was conducted with a single retailer over a limited trial period, so the reported alignment scores may not generalize directly to fashion retailers with different product categories or brand aesthetics. In addition, because prompt engineering was tuned specifically to Pand's Semarang's segmentation taxonomy, adapting the platform to a new retailer would require re-mapping the underlying product hierarchy, which represents a modest but non-trivial customization effort. Future research could examine the platform's performance across multiple retailers simultaneously, and investigate the extent to which end users' AI literacy affects their willingness to adopt and trust AI-generated marketing content, an issue also raised by Lubis (2021) in the context of manufacturing automation.

Beyond Pand's Semarang, this design is well suited to replication across other micro, small, and medium enterprises (MSMEs). Indonesian MSMEs continue to lag behind larger firms in digital and IT capability despite operating in an

increasingly digitized economy (Probohudono et al., 2025), and this gap is compounded when content production still depends on manual, labor-intensive workflows. Replicating a similarly structured, prompt-engineered AI platform across other MSMEs offers a practical pathway to close this technology gap while capturing the same efficiency gains observed in this study shorter content-production cycles, lower staffing costs, and more consistent posting schedules—without requiring in-house AI expertise. In this sense, the platform can be run not only as a one-off solution for Pand's Semarang but as a reusable model that helps other resource-constrained MSMEs adopt AI-driven marketing on their own terms.

4. CONCLUSION

This study designed and evaluated an autonomous AI platform for social media content creation for MSMEs, with Pand's Semarang as a dummy. Two conclusions can be drawn. First, an integrated AI-based platform can be built to meet a fashion retailer's specific content needs, combining AI models for content ideation, narrative generation, image production, and upload scheduling into a single workflow. Second, testing shows that the platform performs well overall: 87% of AI-generated content ideas matched user expectations, generated narratives were fully consistent (100%) with their titles, and AI-generated images achieved a 70% suitability rate together enabling a single employee to produce multiple content pieces in under 30 minutes, a marked improvement over the company's prior manual process. Future work should focus on refining prompt engineering particularly for image generation maintaining periodic AI model updates, and further examining user technology adoption to support broader deployment of the platform across other small and medium fashion retailers. Beyond Pand's Semarang, the segmentation-driven prompt-engineering approach demonstrated here offers a transferable design pattern that other small and medium fashion retailers can adapt to their own product catalogs, lowering the technical barrier to adopting AI in everyday marketing operations.

ACKNOWLEDGMENT

The authors thank Pand's Semarang and the Human Resources Development Agency for Industry, Ministry of Industry, Politeknik APP Jakarta, for supporting this research under research funding of IDR 81,835,000.

5. REFERENCES

Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). (2022). *Indonesia digital outlook*. https://apjii.or.id/berita/d/apjii-di-indonesia-digital-outloook-2022_857

Bhalerao, K., Kumar, A., Kumar, A., & Pujari, P. (2022). A study of barriers and benefits of artificial intelligence adoption in small and medium enterprise. *Academy of Marketing Studies Journal, 26*, 1–6.

Hootsuite, & We Are Social. (2022). *Digital 2022: Indonesia*. DataReportal. https://datareportal.com/reports/digital-2022-indonesia

Labib, E. (2024). Artificial intelligence in marketing: Exploring current and future trends. *Cogent Business & Management, 11*(1), 2348728. https://doi.org/10.1080/23311975.2024.2348728

Lubis, M. S. Y. (2021). Implementasi artificial intelligence pada sistem manufaktur terpadu. *Seminar Nasional Teknologi (Semnastek UISU)*.

Peltier, J. W., Dahl, A. J., & Schibrowsky, J. A. (2024). Artificial intelligence in interactive marketing: A conceptual framework and research agenda. *Journal of Research in Interactive Marketing, 18*(1), 54–90. https://doi.org/10.1108/JRIM-01-2023-0030

Probohudono, A. N., Suhardjanto, D., Aligarh, F., Chayati, N., & Putra, A. A. (2025). Navigating MSMEs' performance through innovation and digital IT capabilities in business strategy. *Social Sciences & Humanities Open, 12*, 101810. https://doi.org/10.1016/j.ssaho.2025.101810

Rajaram, K., & Tinguely, P. N. (2024). Generative artificial intelligence in small and medium enterprises: Navigating its promises and challenges. *Business Horizons, 67*(5), 629–648. https://doi.org/10.1016/j.bushor.2024.05.008

Romadhon, M. R. (2023). Influence of halal lifestyle, Islamic branding, and social media marketing on Muslim fashion purchasing decisions. *Airlangga Journal of Innovation Management, 4*(2), 158–171.

Saefudin, M., Widianti, L. W., & Hendrato, H. (2023). Penerapan platform analisis media sosial berbasis artificial intelligence sebagai model pemasaran produk secara digital. *Seminar Nasional Teknologi Informasi dan Komunikasi STI&K (SeNTIK), 7*(1).

Salim, M., Aprianto, R., Anwar Abu Bakar, S., & Rusdi, M. (2022). Muslim clothing online purchases in Indonesia during COVID-19 crisis. *Economies, 10*(1), 19. https://doi.org/10.3390/economies10010019