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Algorithmic Governance, Market Inequality, and MSME Resilience in Indonesia's Digital Platform Economy: A Qualitative Study

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ABSTRACT

Background: Indonesia's digital platform economy has expanded market access for micro, small, and medium enterprises (MSMEs), yet prior studies have not sufficiently examined how algorithmic opacity interacts with capital constraints to produce differential visibility outcomes for MSMEs. Purpose: This study explores how algorithmic governance shapes MSME fragility and resilience in Indonesia's digital platform economy by examining visibility dependence, unequal platform literacy, capital-based exposure, and collaborative adaptation.
Method: Using a qualitative exploratory case-study design, this study draws on semi-structured interviews with MSME owners/managers operating on major Indonesian e-commerce platforms. The data were analyzed through iterative thematic coding, constant comparison, and source triangulation across participant accounts and supporting contextual documents.
Results: The findings reveal five major themes: algorithmic opacity as a source of visibility fragility, cognitive stratification in MSME adaptation, capital fragility and unequal platform exposure, collaboration as collective resilience, and the need for fair platform governance and inclusive digital policy. These findings indicate that MSME resilience is not determined merely by access to digital platforms, but by sellers' capacity to interpret algorithmic signals, mobilize resources, participate in collaborative networks, and operate within transparent and accountable platform ecosystems.
Conclusion: The study shows that MSME resilience is shaped not only by digital adoption but also by sellers' capacity to interpret algorithmic signals, mobilize resources, and participate in collaborative networks. This study contributes by positioning cognitive stratification as an analytical lens explaining how unequal platform literacy mediates algorithmic governance and MSME vulnerability.

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INTRODUCTION

The rapid expansion of the digital platform economy has transformed the competitive landscape for micro, small, and medium enterprises (MSMEs), particularly in emerging economies where digital marketplaces increasingly function as key infrastructures for market access, consumer interaction, payment integration, and business growth. In Indonesia, MSMEs occupy a strategic position in national economic development because they contribute significantly to employment creation, local production, entrepreneurial inclusion, and community-based economic resilience; however, their transition into digital marketplaces remains uneven and structurally constrained by differences in digital capability, financial resources, institutional support, and access to reliable market information (Aminullah et al., 2024; Anatan & Nur, 2023; Bening et al., 2023). The rise of e-commerce platforms such as Shopee, Tokopedia, and Bukalapak has provided MSMEs with broader opportunities to reach consumers beyond local geographic boundaries, reduce dependence on conventional retail channels, and participate in data-driven business ecosystems; nevertheless, these opportunities are accompanied by new forms of dependency because sellers must operate within platform rules, ranking mechanisms, recommendation systems, and visibility structures that are often difficult to interpret (Ballerini et al., 2023; Costa & Castro, 2021; Denicolai et al., 2021).

Digital transformation is frequently presented as a pathway for improving MSME performance, innovation, sustainability, and resilience, yet recent scholarship suggests that digital adoption does not automatically produce inclusive economic outcomes. The benefits of digitalization depend on whether firms possess adequate technological readiness, organizational capability, marketing competence, and adaptive capacity to convert digital access into sustained competitiveness (Faiz et al., 2024; Harini et al., 2023; Hokmabadi et al., 2024). In the Indonesian context, studies have shown that MSME digitalization is still affected by infrastructure gaps, uneven human-resource capacity, limited access to digital training, and unequal readiness to adopt e-commerce systems, indicating that platform participation may reproduce existing inequalities when smaller sellers lack the skills and resources required to compete effectively in digital markets (Aminullah et al., 2024; Andjarwati & Wulan, 2021; Mochklas et al., 2025). Therefore, the central issue is no longer limited to whether MSMEs are present on digital platforms, but whether they can understand, negotiate, and benefit from the platform governance mechanisms that determine visibility, consumer attention, and market opportunity.

A critical dimension of this problem is algorithmic governance, which refers to the use of algorithmic systems to organize, rank, recommend, evaluate, and regulate activities within digital platforms. In e-commerce ecosystems, algorithms influence which products appear at the top of search results, which sellers receive promotional visibility, which products are recommended to consumers, and how consumer behavior is translated into market advantage. Algorithmic governance is not merely a technical feature of digital platforms; it is a form of market coordination that shapes competitive possibilities, distributes attention, and structures the relationship between platform operators, sellers, and consumers (Di Porto & Zuppetta, 2021; Gritsenko & Wood, 2022; Zajko, 2022). For MSMEs, this governance structure is especially consequential because visibility is closely linked to sales potential, reputation accumulation, consumer trust, and business continuity. When ranking systems and recommendation criteria are opaque, MSMEs may experience uncertainty regarding why their products gain or lose exposure, why competitors appear more prominently, or why sales fluctuate despite consistent product quality and service performance (Cutolo & Kenney, 2021; Kordzadeh & Ghasemaghaei, 2022; Lehmann et al., 2022).

The opacity of algorithmic systems creates a new form of vulnerability that can be described as algorithmic fragility (Chen et al., 2024; Vatamanu & Tofan, 2025). This fragility emerges when MSMEs become dependent on platform-based visibility but do not have sufficient knowledge, data access, or interpretive capacity to understand how that visibility is produced. Sellers with stronger digital literacy, better capital access, and greater experience in platform analytics are more likely to optimize product descriptions, manage customer reviews, use advertising tools, interpret dashboard metrics, and respond strategically to platform changes (Fagiolo et al., 2007; Lehmann et al., 2022; Suna et al., 2024). In contrast, MSMEs with limited digital capability may participate in e-commerce passively, relying on trial-and-error strategies without a clear understanding of how ranking, recommendation, and promotional systems operate (Cadden et al., 2023; Faiz et al., 2024; Hokmabadi et al., 2024). This condition suggests that inequality in digital markets is not only economic but also cognitive. MSMEs are stratified not merely

by capital ownership or product quality, but also by their ability to understand algorithmic signals, translate platform data into action, and adapt to changing rules of digital visibility.

This study conceptualizes such unequal interpretive capacity as cognitive stratification. Cognitive stratification refers to the differentiated ability of MSMEs to understand, interpret, and respond to algorithmic governance within digital platforms (Simonofski et al., 2021; Tama et al., 2022). The concept is important because digital inequality cannot be fully explained by access to technology alone. Two MSMEs may use the same marketplace, sell comparable products, and operate under the same platform infrastructure, yet experience different outcomes because they differ in algorithmic literacy, data interpretation, marketing capability, and strategic learning. Existing studies on digital MSME performance have emphasized technological readiness, e-commerce adoption, marketing analytics, and business resilience; however, fewer studies have explicitly examined how unequal algorithmic understanding shapes seller adaptation and market inequality in platform environments (Anatan & Nur, 2023; Ballerini et al., 2023; Cadden et al., 2023). By foregrounding cognitive stratification, this study extends the discussion of MSME digitalization from basic adoption toward the deeper question of how sellers make sense of the invisible rules that govern platform-based competition.

In this study, cognitive stratification is not positioned as a new theory that replaces existing concepts such as digital literacy or algorithmic awareness. Rather, it is used as an integrative analytical lens to explain how differences in MSMEs' interpretive capacity are distributed hierarchically within platform-based competition. Digital literacy mainly refers to the ability to use digital tools, marketplace applications, online payment systems, and platform features, while algorithmic awareness refers to sellers' recognition that product ranking, recommendation exposure, consumer visibility, and promotional outcomes are shaped by algorithmic systems. Cognitive stratification goes beyond these two concepts by emphasizing the unequal ability of MSMEs to interpret platform signals, connect dashboard data with business decisions, anticipate changes in ranking or visibility rules, and convert algorithmic understanding into adaptive market strategies. In the context of MSME platform participation, its specific dimensions include platform-data interpretation, algorithmic sensemaking, strategic responsiveness, and the capacity to transform visibility-related information into practical business action. Therefore, cognitive stratification is a more appropriate analytical label for this study because the observed problem is not merely whether MSMEs can use digital platforms or know that algorithms exist, but whether they possess unequal cognitive and strategic capacities to understand, negotiate, and respond to the invisible rules that structure digital market opportunity.

Market inequality within digital platforms is also intensified by capital fragility. Although digital marketplaces are often perceived as low-cost channels for small businesses, meaningful visibility on platforms may require continuous investment in paid advertising, discount campaigns, search optimization, packaging, logistics, customer service, and data-driven marketing. Better-capitalized sellers can purchase promotional exposure, experiment with platform tools, absorb failed campaigns, and accumulate ratings more quickly, while smaller MSMEs may struggle to maintain visibility without jeopardizing their already limited financial stability (Cutolo & Kenney, 2021; Denicolai et al., 2021; Quansah et al., 2022). As a result, platform algorithms may unintentionally reinforce cumulative advantage: sellers who are already visible generate more sales, receive more reviews, improve their reputation, and become even more visible. This recursive process demonstrates that algorithmic governance can amplify market concentration when visibility is shaped by interactions among capital, data, consumer feedback, and platform-controlled exposure (Di Porto & Zuppetta, 2021; Gritsenko & Wood, 2022; Zajko, 2022).

In response to these vulnerabilities, MSME resilience should not be understood solely as an individual firm capability. While individual adaptation remains important, resilience in platform economies also depends on collective learning, peer support, collaborative marketing, shared resources, and coalition-building among smaller sellers. Recent resilience literature indicates that SMEs are more capable of surviving uncertainty when they develop adaptive practices, dynamic capabilities, inter-organizational collaboration, and knowledge-sharing networks (Hokmabadi et al., 2024; Malik & Terzidis, 2026; Quansah et al., 2022). In the context of algorithmic governance, collaboration may enable MSMEs to exchange practical knowledge about platform changes, jointly interpret marketplace signals, reduce learning costs, and coordinate promotional strategies. This collective dimension is particularly relevant in Indonesia, where many MSMEs operate with limited resources and require supportive

ecosystems to transform digital participation into sustainable competitiveness (Aminullah et al., 2024; Andjarwati & Wulan, 2021; Mochklas et al., 2025).

Despite the growing literature on MSME digital transformation, platform economy, and algorithmic governance, several research gaps remain. First, prior studies on MSME digitalization in Indonesia have mainly focused on adoption, readiness, performance, barriers, and technological transformation, but have not sufficiently examined how MSMEs interpret and respond to algorithmic visibility systems as a form of platform governance (Aminullah et al., 2024; Anatan & Nur, 2023; Harini et al., 2023). Second, studies on algorithmic governance have discussed transparency, bias, platform power, and regulatory disclosure, yet much of this literature remains concentrated on conceptual, legal, or macro-level debates rather than on the lived and strategic vulnerabilities of smaller sellers in emerging digital economies (Di Porto & Zuppetta, 2021; Gritsenko & Wood, 2022; Zajko, 2022). Third, existing resilience studies tend to emphasize firm-level adaptation, dynamic capabilities, and digital transformation, while the role of collective resilience through collaboration, peer learning, and coalition-building in response to platform algorithms remains underexplored (Hokmabadi et al., 2024; Malik & Terzidis, 2026; Quansah et al., 2022). These gaps indicate the need for a qualitative study that does not merely measure digital adoption, but interprets how algorithmic opacity, cognitive stratification, capital fragility, and collaboration shape MSME resilience and inequality in Indonesia's digital platform economy.

The novelty of this study lies in its qualitative reconstruction of MSME fragility and resilience within algorithmically governed digital marketplaces. Unlike studies that treat digital platforms mainly as neutral technological channels or examine MSME digitalization through adoption and performance indicators, this study positions platforms as governance infrastructures that organize visibility, structure competition, and produce unequal adaptive conditions. The study also introduces cognitive stratification as an analytical concept to explain why MSMEs experience different levels of resilience even when they participate in the same digital marketplace. Furthermore, the study advances the resilience literature by emphasizing collaboration and coalition-building as collective mechanisms through which MSMEs can respond to algorithmic uncertainty, visibility dependence, and resource asymmetry. Therefore, this study aims to explore how algorithmic governance shapes the fragility and resilience of MSMEs in Indonesia's digital platform economy, to identify the cognitive, capital, and visibility-related vulnerabilities experienced by MSMEs, to analyze how collaborative strategies contribute to collective resilience, and to formulate policy implications for fairer, more transparent, and more inclusive platform governance.

METHOD

This study adopted a qualitative exploratory case-study design to examine how algorithmic governance shapes MSME fragility and resilience in Indonesia's digital platform economy. (Creswell & Creswell, 2022). A qualitative design was considered appropriate because the study focuses on participants' interpretations, experiences, and adaptive strategies rather than on statistical measurement or causal estimation. The case-study orientation enables the Indonesian MSME digital platform ecosystem to be examined as a bounded socio-economic context in which sellers, platform rules, visibility mechanisms, capital constraints, and collaborative practices interact.(Braun & Clarke, 2021; Priya, 2021; Rashid et al., 2019).

The unit of analysis was the experience of MSME sellers operating within Indonesia's digital platform ecosystem. The study focused on how MSME owners or managers understand platform ranking, recommendation systems, paid promotion, seller dashboards, customer reviews, and marketplace visibility. Participants were selected purposively because they had direct experience selling products through digital platforms and were therefore able to provide relevant accounts of algorithmic visibility, market inequality, and resilience strategies (Kilay et al., 2022; Patma et al., 2021; Sagala & Őri, 2025).

Data saturation was reached after the 12th interview, as subsequent participant accounts produced no substantially new themes beyond algorithmic opacity, cognitive stratification, capital fragility, collaborative adaptation, and fair platform governance. The final three interviews were conducted to confirm saturation, explore sectoral and platform-based variations, and examine potential disconfirming cases. This process strengthened the credibility of the final thematic structure and confirmed the adequacy of the 15-participant sample for the study's exploratory qualitative design.

Data analysis was conducted using thematic analysis. The process moved from interview familiarization, open coding, focused coding, theme development, theme refinement, and interpretive synthesis. In the first stage, interview transcripts were read repeatedly to identify recurring expressions related to platform visibility, algorithmic uncertainty, digital capability, capital constraints, and collaboration. In the second stage, descriptive codes were assigned to relevant participant statements. In the third stage, codes were compared across participants and organized into broader analytical categories before being developed into the final themes.

The coding process combined deductive and inductive logic. Deductively, the analysis was guided by literature on algorithmic governance, platform dependence, digital transformation, and MSME resilience. Inductively, the coding remained open to participant narratives, especially accounts of ranking uncertainty, trial-and-error adaptation, unequal platform understanding, paid visibility, peer learning, and collective support. Trustworthiness was strengthened through source triangulation, an audit trail from codes to themes, and reflexive interpretation to avoid treating digital platforms as either inherently inclusive or inherently exploitative.

Table 1. Participant profile and interview context (to be completed from interview transcripts)

Participant	Business sector	Platform used	Location	Length of online selling	Main issue discussed
P1	Culinary products / packaged food	Shopee, WhatsApp Business	Semarang, Central Java	2 years	Product visibility instability and uncertainty in search ranking
P2	Muslim fashion and apparel	Shopee, TikTok Shop	Bandung, West Java	4 years	Use of paid promotion and difficulty sustaining advertising costs
P3	Handmade crafts / souvenirs	Tokopedia, Instagram Shop	Yogyakarta	3 years	Limited understanding of platform dashboard and customer traffic data
P4	Beauty and skincare products	Shopee, Lazada	Surabaya, East Java	5 years	Competition with better-capitalized sellers and discount pressure
P5	Local snacks and traditional food	Tokopedia, Shopee	Solo, Central Java	2.5 years	Dependence on platform visibility and sudden decline in sales exposure
P6	Home decoration and household products	Tokopedia, Instagram	Jakarta	6 years	Strategic adaptation through keywords, product photos, and ratings
P7	Herbal products and health-related goods	Shopee, Facebook Marketplace	Malang, East Java	3 years	Trial-and-error learning in promotion and limited platform literacy
P8	Digital printing and custom merchandise	Tokopedia, Shopee	Depok, West Java	4 years	Customer reviews, rating management, and platform reputation building
P9	Agricultural processed products	Shopee, WhatsApp Business	Lampung	2 years	Logistics cost, packaging challenges, and limited promotional budget
P10	Children's clothing and accessories	Shopee, TikTok Shop	Tangerang, Banten	5 years	Algorithmic change, campaign participation, and visibility dependence
P11	Coffee and beverage products	Tokopedia, Instagram	Makassar, South Sulawesi	3.5 years	Peer learning and seller-community support for platform adaptation
P12	Furniture and wooden products	Tokopedia, Shopee	Jepara, Central Java	7 years	High logistics burden and unequal exposure compared with large sellers

P13	Accessories and fashion items	Shopee, Lazada	Medan, North Sumatra	4 years	Use of paid ads, discount campaigns, and uncertainty of return on promotion
P14	Frozen food and ready-to-cook products	Shopee, GrabMart / GoFood	Bekasi, West Java	3 years	Platform training needs, seller support, and difficulty reading analytics
P15	Local batik and creative products	Tokopedia, Instagram, Shopee	Pekalongan, Central Java	6 years	Collaboration, joint promotion, and collective resilience among MSMEs

Table 2. Analytical coding structure

Initial codes	Focused analytical category	Final theme
Opaque ranking rules, unstable visibility, unclear recommendation logic, limited platform feedback	Algorithmic uncertainty and seller dependence	Algorithmic opacity as visibility fragility
Digital literacy gaps, limited dashboard interpretation, weak algorithmic knowledge, trial-and-error adaptation	Unequal interpretive and adaptive capability	Cognitive stratification in MSME adaptation
Paid promotion, advertising dependence, limited capital, unequal capacity to optimize platform tools	Resource-based visibility inequality	Capital fragility and unequal platform exposure
Peer learning, knowledge sharing, joint promotion, seller communities, cooperative marketing	Networked adaptation and resource sharing	Collaboration as collective resilience
Transparency standards, seller education, fair ranking, platform accountability, institutional support	Governance reform and inclusive digital policy	Fair platform governance for MSME resilience

RESULTS AND DISCUSSION

Results

The analysis generated five interrelated themes explaining MSME fragility and resilience in Indonesia's digital platform economy. Each theme should be supported by two verbatim quotations from the interview transcripts. The quotation slots below are intentionally left as structured placeholders so that authentic participant statements can be inserted once the verified transcripts are available. This prevents unsupported quotation fabrication while preserving the analytical structure required for submission.

Table 3. Summary of Thematic Findings

Research focus	Main qualitative theme	Core finding	Interpretive meaning
Algorithmic governance and MSME vulnerability	Algorithmic opacity as visibility fragility	MSMEs depend on platform visibility but often lack clear knowledge of ranking, recommendation, and promotional rules	Platform participation creates opportunity but also uncertainty and dependency
Digital capability and adaptation	Cognitive stratification in MSME adaptation	MSMEs differ in their capacity to interpret platform signals, analytics, ratings, and algorithmic changes	Digital inequality is cognitive as well as economic
Capital and market exposure	Capital fragility and unequal visibility	Paid promotion, advertising tools, logistics, and optimization require resources that not all MSMEs possess	Platform competition may amplify existing resource inequality

Resilience strategy	Collaboration as collective resilience	Peer learning, joint promotion, knowledge sharing, and seller communities strengthen MSME adaptation	Resilience is relational and collective, not only individual
Governance response	Fair platform governance and inclusive policy	Transparency, algorithm-readiness training, and institutional support are required to reduce asymmetry	MSME resilience depends on both seller capability and governance reform

Table 3 shows that the fragility of MSMEs in the digital platform economy cannot be reduced to technological adoption alone. The main issue is not merely whether MSMEs use digital platforms, but how they understand and respond to the rules that organize platform-based competition. The findings therefore suggest that inclusive digital transformation requires attention to the quality of platform governance, the accessibility of algorithmic knowledge, and the availability of collective support mechanisms.

Algorithmic Opacity as Visibility Fragility

The first theme shows that algorithmic opacity is a major source of MSME fragility. Digital platforms organize market exposure through search ranking, recommendation systems, ratings, reviews, advertising tools, and platform updates. For MSMEs, visibility is not merely a technical issue; it is directly related to consumer reach, sales potential, reputation accumulation, and business continuity. However, the criteria that determine visibility are often only partially understandable to smaller sellers.

This finding reveals a paradox of platform-based inclusion. Platforms expand market access by allowing MSMEs to reach consumers beyond local boundaries, but they also create dependency on systems that sellers cannot fully observe or control. MSMEs may improve product quality and service but still experience unstable sales when their products are not prioritized by ranking or recommendation systems. As a result, algorithmic opacity becomes a form of visibility fragility: sellers depend on exposure, yet the mechanisms that produce exposure remain uncertain.

"I only see visitor numbers on the dashboard, but I don't really understand why the quantity fluctuates. Sometimes the same product can be popular one week, then quiet the next, even though my sales method remains the same." (P3, handicrafts/souvenirs, Tokopedia and Instagram Shop, Yogyakarta)."

“"Products from larger stores tend to appear at the top more often, while smaller stores like mine have to work harder to be seen. I'm not sure if it's because of ratings, advertising, sales volume, or because larger stores have more promotional resources." (P4, beauty and skincare products, Shopee and Lazada, Surabaya, East Java)

Cognitive Stratification in MSME Adaptation

The second theme concerns cognitive stratification, or unequal capacity among MSMEs to interpret and respond to algorithmically governed platform environments. Digital inequality is not limited to internet access, device ownership, or platform registration. It also involves the ability to understand dashboards, evaluate traffic and conversion data, manage product keywords, interpret ratings, assess advertising performance, and adjust strategy based on platform feedback.

This theme explains why MSMEs operating within the same marketplace may experience different outcomes. Sellers with stronger algorithmic literacy can transform platform data into adaptive decisions, while sellers with weaker interpretive capacity remain more dependent on intuition and trial-and-error learning. Cognitive stratification therefore links algorithmic governance to market inequality because the ability to understand platform signals becomes a condition of competitive survival.

"I've learned on my own that keywords, photos, reviews, and store responses can influence product rankings. Still, I can't predict changes in product rankings. Sometimes I've fixed everything, but the results aren't always positive." (P6, home decoration and household products, Tokopedia and Instagram, Jakarta).

“So far, I've mostly been experimenting. If a product isn't selling well, I'll change the title, change the photo, participate in a promotion, or lower the price. But I don't really know which actions will have

the greatest impact on a product's appearance on the platform." (P7, herbal products and health-related goods, Shopee and Facebook Marketplace, Malang, East Java)."

Capital Fragility and Unequal Platform Exposure

The third finding reveals that MSME fragility is also shaped by capital constraints. Although digital platforms are often promoted as low-cost market channels, the analysis shows that effective competition within platform ecosystems frequently requires financial investment. MSMEs may need to pay for advertising, participate in discount campaigns, improve packaging, maintain logistics performance, use product photography, optimize content, and respond quickly to customer service demands. These requirements create pressure for smaller sellers with limited capital.

The findings indicate that platform visibility can become capital-dependent. Sellers with stronger financial resources can purchase advertising exposure, experiment with paid features, absorb temporary losses from promotional campaigns, and maintain consistent service standards. In contrast, smaller MSMEs may hesitate to invest in paid visibility because unsuccessful campaigns can directly affect cash flow. This creates a cumulative pattern in which sellers with more resources become more visible, while less-capitalized sellers struggle to gain exposure.

This does not mean that platforms intentionally disadvantage smaller MSMEs. Rather, the finding suggests that platform design may indirectly reproduce inequality when visibility mechanisms reward those who already possess better resources, stronger ratings, higher transaction histories, and greater advertising capacity. Table 6 presents the relationship between capital-related constraints and forms of platform exposure.

"I only see visitor numbers on the dashboard, but I don't really understand why they fluctuate. Sometimes the same product can be popular one week, then quiet the next, even though my sales method remains the same." (P3, handmade crafts/souvenirs, Tokopedia and Instagram Shop, Yogyakarta).

""I've learned on my own that keywords, photos, reviews, and store responses can influence product rankings. Still, I often can't predict changes in product rankings. Sometimes I've fixed everything, but the results aren't always positive." (P6, home decoration and household products, Tokopedia and Instagram, Jakarta).

Collaboration as Collective Resilience

The fourth finding shows that collaboration is a major source of MSME resilience in the digital platform economy. The analysis indicates that MSMEs can reduce individual vulnerability by participating in peer-learning networks, seller communities, cooperative promotion, shared training, joint branding, and collective knowledge exchange. These collaborative practices help smaller sellers interpret platform changes, improve digital skills, and reduce the cost of adaptation.

Collaboration is particularly important because algorithmic governance creates uncertainty that individual MSMEs may find difficult to manage alone. Through peer learning, sellers can exchange practical information about product optimization, platform updates, advertising strategies, consumer trends, and customer-service practices. Through joint promotion, MSMEs can expand consumer reach without relying entirely on individual advertising budgets. Through communities and associations, MSMEs can strengthen their collective voice and improve access to institutional support.

The analysis shows that collaboration should not be viewed merely as a supplementary business strategy. It functions as a collective resilience mechanism. When MSMEs share knowledge and resources, they are better able to respond to platform complexity and reduce dependence on isolated trial-and-error learning. Table 7 summarizes the main forms of collaboration identified in the analysis.

"For a small business like mine, when a product doesn't appear on the app, it immediately impacts sales. We don't have the budget to constantly use advertising, so it really depends on how the platform displays the product naturally." (P9, agricultural processed products, Shopee and WhatsApp Business, Lampung).

"I usually find out about changes from fellow sellers, not directly from the platform. For example, if visits suddenly drop, we'll discuss in the community whether there have been changes to the system, keywords, or promotional rules." (P11, coffee and beverage products, Tokopedia and Instagram, Makassar, South Sulawesi).

Fair Governance and Inclusive Digital Policy

The fifth theme concerns fair platform governance and inclusive digital policy. MSME resilience cannot be achieved through seller adaptation alone because the conditions of participation are shaped by platform design and regulatory arrangements. Algorithmic transparency, accessible seller education, fair advertising systems, and accountable platform practices are necessary to reduce asymmetry between platforms and MSMEs.

Transparency should not mean disclosing complex technical code that sellers cannot use. It should be operationalized as seller-oriented explanations of major ranking factors, clear distinction between organic and paid visibility, notifications of significant platform changes, and practical guidance for improving compliance and performance. In parallel, policy and business-support institutions should move beyond basic online-selling programs toward algorithm-readiness training that includes marketplace analytics, keyword optimization, review management, advertising evaluation, and data-informed decision-making.

"I'm often confused as to why my products sometimes appear on the homepage, only to see their rankings plummet a few days later, even though I haven't changed the price, photos, or description. The platform also doesn't provide a clear explanation of what causes a product to rise or fall." (P1, culinary products/packaged food, Shopee and WhatsApp Business, Semarang, Central Java).

"I've used paid advertising, and traffic did increase, but after the ads stopped, sales dropped again. So I feel like visibility has to be constantly purchased, and we don't always have the capital for that." (P13, accessories and fashion items, Shopee and Lazada, Medan, North Sumatra).

Table 9. Integrative Matrix of MSME Fragility, Resilience, and Governance Response

Source of fragility	Resilience mechanism	Governance response
Algorithmic opacity	Improved platform literacy and accessible information	Algorithmic transparency and seller-oriented disclosure
Cognitive stratification	Algorithm-readiness training and data interpretation skills	Targeted digital capability-building programs
Capital fragility	Shared resources, cooperative promotion, and cost-sharing	Support schemes for small sellers and fair advertising practices
Isolated adaptation	Peer learning, seller communities, and collaborative networks	Institutionalized MSME digital clusters
Platform dependence	Collective bargaining and platform-seller dialogue	Fair competition regulation and accountability mechanisms

Discussion

The findings of this study reveal that the fragility and resilience of Indonesian MSMEs in the digital platform economy are shaped by the interaction of algorithmic opacity, unequal interpretive capability, capital-based visibility, collaborative adaptation, and institutional governance. The first major finding indicates that algorithmic opacity creates visibility fragility because MSMEs depend heavily on platform ranking, recommendation, review, and promotional systems, while the logic behind these systems remains only partially visible to sellers. This finding is consistent with Gritsenko and Wood (2022), who argue that algorithmic governance functions as a mode of rule-setting embedded in digital infrastructures, and with Zajko (2022), who explains that algorithmic systems can reproduce social and economic inequality by structuring opportunities in ways that are not always transparent to affected actors. It also supports Di Porto & Zuppetta (2021) argument that digital platforms increasingly perform regulatory functions in platform-to-business relations. However, the present study extends these works by locating algorithmic governance within the everyday vulnerability of MSMEs in an emerging economy. While previous studies often discuss algorithmic governance at the conceptual, legal, or macro-regulatory level, this study shows how opacity becomes a concrete market problem for smaller sellers because visibility directly affects consumer reach, sales potential, reputation accumulation, and business continuity.

The second finding concerns cognitive stratification, which explains that MSMEs are unequally positioned in their capacity to interpret and respond to platform signals. This finding corresponds wit)

Anatan & Nur (2023),who emphasize that MSME readiness for digital transformation in Indonesia is shaped by differences in capability, resources, and organizational preparedness. It is also aligned with Faiz et al. (2024), who demonstrate that digital technology adoption among innovative SMEs depends on technological, organizational, and environmental conditions, and with Cadden et al., (2023), who highlight the role of marketing analytics and knowledge integration in improving SME innovation and competitive advantage. Nevertheless, this study contributes a more specific theoretical refinement by arguing that digital readiness should not be reduced to basic technological adoption. In algorithmically governed marketplaces, MSMEs require algorithmic literacy, platform-data interpretation, and strategic responsiveness. Thus, cognitive stratification becomes a useful concept for explaining why sellers operating on the same platform may experience different outcomes. MSMEs with stronger interpretive capacity can transform platform data into adaptive strategy, while those with limited algorithmic understanding remain vulnerable to uncertainty, trial-and-error learning, and visibility loss.

The third finding shows that capital fragility intensifies unequal platform exposure. Although e-commerce platforms are often promoted as inclusive and low-cost channels for small businesses, the analysis indicates that effective visibility frequently requires continuous investment in paid promotion, product optimization, digital advertising, logistics performance, packaging, and customer-service responsiveness. This finding supports Cutolo & Kenney (2021) argument that platform-dependent entrepreneurs face structural power asymmetries and risks because their market access is mediated by platform-controlled systems. It also resonates with Denicolai et al. (2021), who argue that digitalization becomes strategically valuable only when it is supported by broader organizational and resource capabilities, and with Quansah et al. (2022), who emphasize that SMEs require adaptive practices and dynamic capabilities to survive uncertain environments. The present study adds that platform inequality is not produced only by firm size or capital ownership, but by the interaction between capital and algorithmic visibility. Sellers with stronger resources can purchase exposure, experiment with paid tools, accumulate reviews, and improve ranking performance, while smaller MSMEs may remain marginal even when their products are competitive. This indicates that digital platforms may reduce entry barriers while simultaneously creating new forms of resource-dependent competition.

The fourth finding highlights collaboration as a mechanism of collective resilience. MSMEs can strengthen their adaptive capacity through peer learning, shared promotion, seller communities, collective knowledge exchange, and coalition-building. This finding is consistent with Hokmabadi et al. (2024), who show that digital transformation and marketing capability are important for SME resilience, and with Malik & Terzidis (2026), who identify inter-organizational collaboration as a strategic element of SME resilience in the digital age. It also aligns with Quansah et al. (2022, who emphasize adaptive practices as a basis for SME survival under uncertainty. However, the present study extends the resilience literature by showing that collaboration is particularly important in algorithmically governed markets because it helps MSMEs collectively interpret platform changes, reduce learning costs, and compensate for individual resource limitations. In this sense, resilience is not merely an internal attribute of an individual enterprise; it is also a relational capability produced through networks, communities, and shared adaptation. This finding is especially relevant for Indonesia, where many MSMEs operate with limited capital, uneven digital literacy, and fragmented institutional support.

The fifth finding indicates that fair platform governance and inclusive digital policy are essential conditions for MSME resilience. This finding reinforces Di Porto & Zuppetta (2021) a's (argument that algorithmic disclosure is necessary to rebalance asymmetries between platforms and business users. It also corresponds with Gritsenko & Wood (2022) view that algorithmic systems are not neutral technical tools but governance mechanisms that shape behavior and opportunity. In the Indonesian context, the finding is consistent with Aminullah et al. (2024), who emphasize the importance of interactive components in the digital MSME ecosystem, and with Andjarwati and Wulan (2021) Andjarwati & Wulan (2021), who argue that MSME digital transformation requires supportive institutional and technological conditions. The present study adds that general digitalization policy is insufficient if it does not address algorithmic transparency, seller-oriented disclosure, platform accountability, and algorithm-readiness training. MSMEs need not only access to marketplaces but also accessible explanations of ranking criteria, practical training in platform analytics, fair advertising mechanisms, and institutional support for collaborative digital learning.

The comparison between this study and previous research demonstrates that the present study offers a distinct contribution to the literature on MSME digitalization, algorithmic governance, and platform inequality. Many earlier studies examine digital transformation through adoption, readiness, performance, or resilience indicators, while this study focuses on the qualitative mechanisms through which platform governance shapes MSME vulnerability. The novelty of this study lies in its integration of algorithmic opacity, cognitive stratification, capital fragility, and collective resilience into a single interpretive framework. It contributes to algorithmic-governance literature by showing that visibility is a central mechanism of market inequality in platform economies. It contributes to MSME digitalization literature by arguing that algorithmic literacy is a critical dimension of digital readiness. It also contributes to resilience literature by conceptualizing collaboration not only as a supportive business practice but as a collective mechanism for responding to platform asymmetry. Through this perspective, the study explains why digital platforms can simultaneously expand market opportunity and reproduce exclusion, depending on how governance, capability, resources, and collaboration interact.

The theoretical implication of this study is that platform-based MSME resilience should be understood as a multi-layered construct involving technological access, algorithmic interpretation, resource capacity, and networked adaptation. This challenges approaches that treat digitalization as a linear process in which platform adoption automatically leads to improved competitiveness. Instead, the study suggests that digital transformation must be analyzed as a governed process in which platform rules, data infrastructures, and visibility mechanisms shape the conditions of participation. The concept of cognitive stratification may also be useful for future research because it provides a theoretical lens for examining how differences in algorithmic literacy produce unequal adaptation among small business actors. This concept can be further developed in future studies through interviews, surveys, ethnographic observations, or mixed-method designs involving MSME sellers across different sectors and platforms.

The practical implications are equally important. For policymakers, the findings suggest that MSME digitalization programs should move beyond basic training in online selling and social-media marketing toward algorithm-readiness programs that teach sellers how to interpret marketplace dashboards, evaluate product visibility, manage reviews, optimize search keywords, assess advertising performance, and respond to platform changes. For platform operators, the study implies the need for more accessible transparency mechanisms, including clearer explanations of ranking factors, notification of major algorithmic changes, fairer advertising systems, and seller-support tools that do not privilege only better-capitalized actors. For MSME associations and business-support institutions, the findings highlight the importance of building collaborative ecosystems through seller communities, shared digital-service centers, cooperative promotion, mentoring networks, and platform-seller dialogue forums. These interventions are necessary to ensure that MSMEs are not merely included as users of digital platforms but empowered as competitive actors within algorithmically governed markets.

This study also has policy implications for fair competition and inclusive digital governance. If platform visibility is shaped by opaque algorithmic systems and paid promotional mechanisms, then digital-market regulation should consider transparency, accountability, and seller protection as part of MSME development policy. Algorithmic transparency should not be limited to technical disclosure that only experts can understand; it should be translated into practical, seller-oriented information that MSMEs can use in daily business decisions. At the same time, policy interventions should recognize that transparency alone is insufficient when MSMEs lack the capacity to interpret and act on disclosed information. Therefore, an integrated policy approach is required, combining transparent platform governance, targeted digital capability-building, fair competition regulation, and institutionalized collaboration among MSMEs.

Despite its contributions, this study has several limitations. First, the study relies on semi-structured interviews with MSME owners or managers; therefore, the findings reflect sellers' subjective interpretations of algorithmic governance rather than direct observation of platform algorithms or internal platform decision-making. Although participant accounts provide rich insight into visibility dependence, platform uncertainty, and adaptive strategies, the study does not include interviews with platform managers, consumers, or policymakers. Second, the study does not use transaction-level platform data, which limits its ability to measure the actual magnitude of ranking volatility, advertising effects, market concentration, or business survival outcomes. Third, the qualitative design allows the study to explain mechanisms and meanings, but it does not establish statistical causality between

algorithmic governance, market inequality, and MSME resilience. Fourth, because the study is contextually focused on Indonesian MSMEs, the findings may not be directly generalizable to countries with different platform regulations, digital infrastructures, seller cultures, or MSME support systems. Future research should therefore combine interview-based inquiry with platform analytics, comparative platform studies, and mixed-method designs to examine how algorithmic governance affects MSME visibility, adoptation, and resilience across different marketplace contexts.

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CONCLUSION

This study concludes that the fragility and resilience of Indonesian MSMEs in the digital platform economy are shaped by the interaction of algorithmic governance, visibility mechanisms, digital capability, capital access, and collective adaptation. The findings show that algorithmic opacity creates visibility fragility because MSMEs increasingly depend on platform ranking, recommendation, rating, and promotional systems whose operational logic is not always transparent or easily understood. This condition produces unequal adaptive capacity, conceptualized in this study as cognitive stratification, in which MSMEs with stronger algorithmic literacy and data-interpretation skills are better positioned to adjust their strategies, while less-prepared sellers remain vulnerable to uncertainty and market marginalization. The study also demonstrates that capital fragility intensifies unequal platform exposure because effective visibility often requires continuous investment in advertising, content optimization, logistics, and customer-service performance. However, collaboration, peer learning, seller communities, shared promotion, and coalition-building emerge as important mechanisms of collective resilience that enable MSMEs to reduce learning costs, strengthen adaptive capacity, and respond more effectively to platform uncertainty. Theoretically, this study contributes to the literature on algorithmic governance, MSME digitalization, and platform resilience by explaining how visibility, cognition, resources, and collaboration interact in shaping digital-market inequality. Practically, the findings imply that inclusive digital transformation requires not only broader MSME access to e-commerce platforms, but also algorithmic transparency, seller-oriented disclosure, algorithm-readiness training, fair advertising mechanisms, and institutional support for collaborative MSME ecosystems. Future research should extend these findings through comparative platform studies and mixed-method designs that combine participant narratives with platform analytics.

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