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Automotive Repair SMEs' Marketing Performance: Digital Transformation, Knowledge Antecedents, Social Media Mediation, Market Turbulence Moderation

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ABSTRACT

Purpose – This study examines knowledge capabilities as antecedents of digital transformation and its relationship with marketing performance, considering social media marketing as a mediator and market turbulence as a moderator among Indonesian automotive repair MSMEs.
Design/methodology/approach – A cross-sectional survey involved 227 owners and managers. Responses were analyzed using PLS-SEM in SmartPLS 4.0 with 5,000 bootstrap subsamples.
Findings/Results – Absorptive capacity (p = 0.402) and knowledge management capability (p = 0.061) were not significantly associated with digital transformation. Digital transformation was positively associated with marketing performance (p = 0.005), with significant mediation through social media marketing (p < 0.001). Market turbulence negatively moderated this relationship (p = 0.022), contrary to the proposed direction.
Originality/Value – The study integrates knowledge capabilities, digital transformation, social media marketing, and market turbulence in a conventional service sector, identifying a marketing mechanism and an environmental constraint on digital transformation's benefits..

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1. Introduction

Digital transformation changes how firms coordinate operations and communicate with customers, but the adoption of digital tools does not necessarily amount to a change in organizational capabilities. Foundational analyses and reviews of digital transformation describe the process as an interplay between technologies, strategy, organizational structure, and value creation (Ritter & Pedersen, 2020; Hanelt et al., 2021; Verhoef et al., 2021; Kraus et al., 2022). This distinction is relevant to small service businesses whose customer relationships often develop through repeated face-to-face transactions. For automotive repair shops, a digital payment facility or a social media account may increase accessibility without necessarily transforming the management of technical knowledge or service processes. Research on SME digitalization emphasizes that organizational and financial conditions influence whether technology adoption becomes a sustainable business practice (Sagala & Őri, 2024; Hokmabadi et al., 2024). Marketing performance has long been conceptualized in terms of market outcomes and capabilities (Vorhies & Morgan, 2005; Gao, 2010). The marketing consequences of digitalization therefore warrant examination alongside the internal capabilities and external market conditions of the firms concerned.

Automotive repair shop MSMEs provide an informative setting because their services depend on technical competence, customer trust, and locally embedded relationships. Potential digital applications include online booking, electronic service records, digital payments, and social media, while service delivery continues to depend on skilled mechanics and physical equipment. Such a combination makes it difficult to infer marketing benefits from the presence of technology alone. Studies of service-sector digitalization and customer value creation suggest that organizational implementation and customer-facing use matter as much as adoption itself (Li et al., 2018; Matarazzo et al., 2021; Danuso et al., 2022). Evidence on digital skills and transformation in service industries also suggests that personnel capabilities shape the operational relevance of digital systems (Bastone et al., 2024; Nadeem et al., 2024). These issues motivate a sector-specific examination rather than treating all MSMEs as technologically or organizationally equivalent.

One proposed source of digital capability is absorptive capacity, which concerns recognizing, assimilating, transforming, and exploiting external knowledge (Cohen & Levinthal, 1990; Zahra & George, 2002). In repair shops, this may involve learning from changing vehicle technologies, suppliers, technical training, or customer requirements. However, acquiring technical information is not identical to translating it into digital processes for customer records, booking, or promotion. Prior studies relate absorptive capacity to strategic flexibility and organizational transformation, but they also show that capabilities operate within specific organizational arrangements (Miroshnychenko et al., 2021; Siachou et al., 2021). Recent research on digital transformation identifies the importance of structural, social, and human capital in converting knowledge into action (Lang et al., 2023; Ramadan et al., 2023). Accordingly, an empirical association between absorptive capacity and digital transformation should be evaluated rather than presumed.

Knowledge management capability is conceptually distinct from absorbing external knowledge because it also concerns the organizational processes through which information is retained, shared, and applied (Gold et al., 2001). For a small workshop, the issue is whether experience about fault diagnosis, spare parts, repairs, and customers remains personal knowledge or becomes accessible for coordinated service delivery. Reviews of knowledge

management and digital transformation describe this organizational dimension as a potential implementation constraint (de Bem Machado et al., 2022). Studies in manufacturing SMEs likewise investigate links among knowledge management, entrepreneurial competence, and performance, while recognizing that the relationships depend on other capabilities (Al Koliby et al., 2024a, 2024b; Asad, 2024). Research on digital orientation and business transformation suggests that the extent of digital maturity cannot be inferred solely from the existence of technical know-how (Nasiri et al., 2022). The present study therefore models knowledge management capability separately from absorptive capacity.

A second issue is how digital transformation becomes visible in marketing outcomes. Social media marketing permits service businesses to communicate with customers, explain completed work, manage enquiries, and distribute educational or promotional content, but these activities constitute a use of technology rather than digital transformation itself. Marketing research distinguishes social media strategy, customer engagement, and the conversion of online activity into business value (Kannan & Li, 2017; Appel et al., 2020; Li et al., 2021; Li et al., 2023; Bartoloni & Ancillai, 2024). Empirical evidence connects social media to website traffic, purchasing activity, organizational value creation, and SME performance under particular conditions (Dolega et al., 2021; Lin et al., 2021; Fang et al., 2021). Work on content strategy and multichannel marketing also stresses that communication quality cannot be replaced by platform presence (Sakas et al., 2022; Drossos et al., 2023). It is consequently useful to examine social media marketing as a mediator between digital transformation and marketing performance instead of conflating these constructs.

The marketing consequences of digitalization may also depend on market turbulence, defined here in terms of changing customer needs, characteristics, and demand (Kohli & Jaworski, 1990; Jaworski & Kohli, 1993). This is a contingency rather than an automatic source of stronger performance: rapid change can make customer information more valuable, while simultaneously exposing deficits in workshop equipment and technical readiness. Research on SME resilience, agility, and entrepreneurial marketing provides differing reasons why environmental dynamism could strengthen or weaken the contribution of technology (Wilden et al., 2019; Al Omoush et al., 2023; Corvello et al., 2023; Setia et al., 2024; Sulaiman et al., 2024). Other studies distinguish the costs, risks, and strategic conditions of business digitalization from its expected opportunities (Tamvada et al., 2022; Chen et al., 2024; Annarelli & Palombi, 2021). A recent SME study explicitly connected digital transformation, social media marketing, market turbulence, and marketing performance, although its findings arose in a different national and sectoral setting (Amin et al., 2025). Whether a similar configuration holds for automotive repair shops in Indonesia remains an empirical question.

This study addresses that question by examining a six-construct model among automotive repair shop MSMEs in Indonesia. It tests whether absorptive capacity and knowledge management capability are associated with digital transformation, whether digital transformation is associated with marketing performance, whether social media marketing mediates that relationship, and whether market turbulence moderates it. The analysis uses survey data from 227 owners and decision-making managers and a partial least squares structural equation modeling approach. Rather than treating technology adoption as uniformly beneficial, the model distinguishes antecedent knowledge capabilities, customer-facing marketing practices, and environmental conditions. Its contribution is a sector-specific assessment of these relationships in a conventional, technically oriented service industry. The

findings are interpreted as associations because the cross-sectional design does not establish temporal or causal ordering.

2. Methodology

Research design and setting

A cross-sectional quantitative survey was used to examine the relationships among six latent constructs: absorptive capacity (AC), knowledge management capability (KMC), digital transformation (DT), social media marketing (SMM), market turbulence (MT), and marketing performance (MP). The setting comprised automotive repair shop MSMEs in Indonesia. An online questionnaire was administered through Google Forms, with statements scored on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). This design was suitable for estimating associations among the reported constructs at one point in time, although it cannot establish causal ordering. The findings are interpreted in relation to the respondents and their operational settings.

Participants and eligibility

The target respondents were automotive repair shop owners and managers with decision-making authority. Eligible firms had operated for at least two years and had actively used at least two digital platforms in the preceding year. A rule-of-thumb calculation based on the initial 29 indicators yielded a recommended sample of 145, while the achieved sample was 227 respondents. Given the sample composition, the estimates are not treated as nationally representative of all repair shop MSMEs. Of the respondents, 218 (96.0%) were owners and nine (4.0%) were managers, and 74.4% of respondents operated on Java Island.

Instrument and measures

The questionnaire initially comprised 29 indicators: four for AC, five for KMC, six for DT, five for SMM, five for MT, and four for MP. AC items addressed knowledge acquisition, assimilation, transformation, and exploitation (Cohen & Levinthal, 1990; Zahra & George, 2002); KMC items addressed the acquisition, storage, sharing, and use of knowledge (Gold et al., 2001). DT items covered commitments, adoption, opportunity recognition, technological monitoring, and digital investment. SMM items addressed content, interaction, community activities, customer relationships, and promotion, while MT items addressed shifts in customer needs, customer characteristics, and market demand. MP items assessed new-market entry, new-service introduction, perceived success of new services, and market share. These items were adapted from the conceptual and measurement literature cited for the study, including Amin et al. (2025) and Chatterjee and Kar (2020).

Analytical procedure

The data were analyzed using partial least squares structural equation modeling in SmartPLS 4.0, with an initial assessment of the measurement model followed by examination of the structural paths. Outer loadings and average variance extracted (AVE) were used to summarize convergent validity; Cronbach's alpha and composite reliability summarized internal consistency. Cross-loadings and the Fornell–Larcker criterion were used to examine discriminant validity, after which 12 indicators were removed before estimation of the final structural model. Variance inflation factors, coefficients of determination (R^2), effect sizes (f^2), and bootstrapped hypothesis tests using 5,000 subsamples were subsequently reported, with statistical significance evaluated at 5%. Current PLS-SEM guidance emphasizes transparent reporting of construct coverage, discriminant validity, and uncertainty around path estimates,

which is important when many indicators are removed (Hair et al., 2022; Sarstedt et al., 2022). The reported hypotheses were interpreted using the available bootstrap t-statistics, p-values, and effect-size indices. Figure 1 summarizes the stages of survey measurement and structural analysis used in this study.



Figure 1. Analytical workflow based on the reported survey and PLS-SEM procedure

The diagram begins with the 227 survey responses used in the study. The initial questionnaire contained 29 indicators distributed across six constructs. The measurement model was assessed before structural relationships were interpreted. Twelve indicators were removed following the discriminant-validity assessment. Seventeen indicators were retained in the final model. The final stage involved structural evaluation and bootstrap-based hypothesis testing, rather than a separate dataset or experimental phase.

3. Results

Respondent characteristics

The distribution of respondents by role and region is presented in Table 1 to define the empirical scope of the analysis.

Table 1. Characteristics of the survey respondents (N = 227)

Characteristic	Category	Percent of sample
Respondent role	Business owner	96.0%
Respondent role	Manager with decision-making authority	4.0%
Business operating period	At least two years	100%
Operating region	Java Island (total)	74.4%
Operating region	Greater Jakarta (Jabodetabek)	38.8%
Operating region	East Java	14.5%
Operating region	Central Java and Yogyakarta	11.5%
Operating region	West Java outside Jabodetabek	9.7%

Most respondents were business owners rather than managers. All firms satisfied the minimum two-year operating criterion described in the method. Nearly three quarters of respondents were based on Java Island. Greater Jakarta contributed the largest reported regional share. The listed Java subregions are components of the Java total, not additional independent categories, and their rounded percentages differ from that total by 0.1 percentage point. This geographic concentration limits the extent to which the sample can characterize workshops in other Indonesian regions.

Measurement model

The measurement-model assessment led to the removal of indicators; Table 2 documents the composition of the retained measures.

Table 2. Retention and removal of indicators

Construct	Initial n	Removed indicators	Retained indicators
Absorptive capacity (AC)	4	AC1, AC2	AC3, AC4
Knowledge management capability (KMC)	5	KM1, KM2, KM3	KM4, KM5
Digital transformation (DT)	6	DT2, DT4, DT5	DT1, DT3, DT6
Social media marketing (SMM)	5	SM2, SM3	SM1, SM4, SM5
Market turbulence (MT)	5	None	MT1, MT2, MT3, MT4, MT5
Marketing performance (MP)	4	MP2, MP3	MP1, MP4
Total	29	12 removed	17 retained

The initial instrument comprised 29 indicators across the six constructs. The refinement removed 12 indicators, equivalent to more than two fifths of the initial item set. No market-turbulence indicators were removed. Absorptive capacity, knowledge management capability, and marketing performance were each reduced to two retained indicators. The remaining 17 indicators formed the basis of the final statistical tests. Because this reduction may narrow what the constructs represent, the reported model should be interpreted as the final operationalization rather than an unchanged test of every original dimension.

Table 3 presents the available average variance extracted values for the final model for the final model.

Table 3. Reported convergent validity of retained measures

Construct	Final indicators (n)	AVE
Digital transformation	3	0.631
Social media marketing	3	0.680
Marketing performance	2	0.706
Knowledge management capability	2	0.720
Absorptive capacity	2	0.771
Market turbulence	5	0.790

Source: Authors' survey data and SmartPLS 4.0 results.

Every reported AVE value exceeded 0.50 in the retained model. Digital transformation had the lowest AVE at 0.631. Market turbulence had the highest AVE at 0.790. Outer loadings ranged from 0.782 to 0.901 after the removal of 12 indicators. These values support a favorable convergent-validity assessment for the retained items. They do not, on their own, establish discriminant validity or demonstrate that the removed content is adequately represented.

Table 4 reports the available reliability statistics for the two constructs identified in the analysis as having comparatively low alpha values.

Table 4. Reported reliability statistics for two-item constructs

Construct	Cronbach's alpha	Composite reliability (ρc)
Knowledge management capability	0.611	0.837
Marketing performance	0.584	0.828

Knowledge management capability had a Cronbach's alpha of 0.611. Marketing performance had a lower alpha of 0.584. The corresponding composite reliability values were 0.837 and 0.828. Across the model, composite reliability values ranged from 0.828 to 0.950, with the two-item constructs presented separately here. These mixed reliability findings require a more cautious interpretation than a blanket claim that all aspects of instrument quality were

established. In particular, reliance on two retained indicators warrants attention to the substantive breadth of KMC and MP. The square roots of AVE used in the discriminant-validity assessment are presented in Table 5.

Table 5. Square roots of AVE reported for the final model

Construct	Square root of AVE
Absorptive capacity	0.878
Digital transformation	0.795
Knowledge management capability	0.848
Marketing performance	0.840
Market turbulence	0.889
Social media marketing	0.825

The reported values ranged from 0.795 for digital transformation to 0.889 for market turbulence. These diagonal values are consistent with the square roots of the AVEs listed in Table 3, subject to rounding. The retained model was interpreted as satisfying the Fornell–Larcker criterion following indicator removal. However, a comparison with the correlations among all pairs of constructs cannot be reproduced from diagonal values alone. The table therefore summarizes the diagonal values rather than providing a complete discriminant-validity matrix. The loss of 12 indicators remains a separate content-validity consideration even when numerical convergence improves.

Structural model and hypothesis testing

The reported structural model explained 16.5% of the variance in DT, 56.6% in SMM, and 62.0% in MP, with VIF values ranging from 1.000 to 3.097. The effect-size assessment yielded an f^2 of 1.303 for DT → SMM, 0.188 for SMM → MP, 0.043 for KMC → DT, 0.036 for the interaction MT × DT → MP, 0.033 for DT → MP, 0.012 for MT → MP, and 0.008 for AC → DT. These effect-size estimates should be read alongside, rather than substituted for, the hypothesis tests. Figure 2 illustrates the tested paths using the available hypothesis-test statistics.

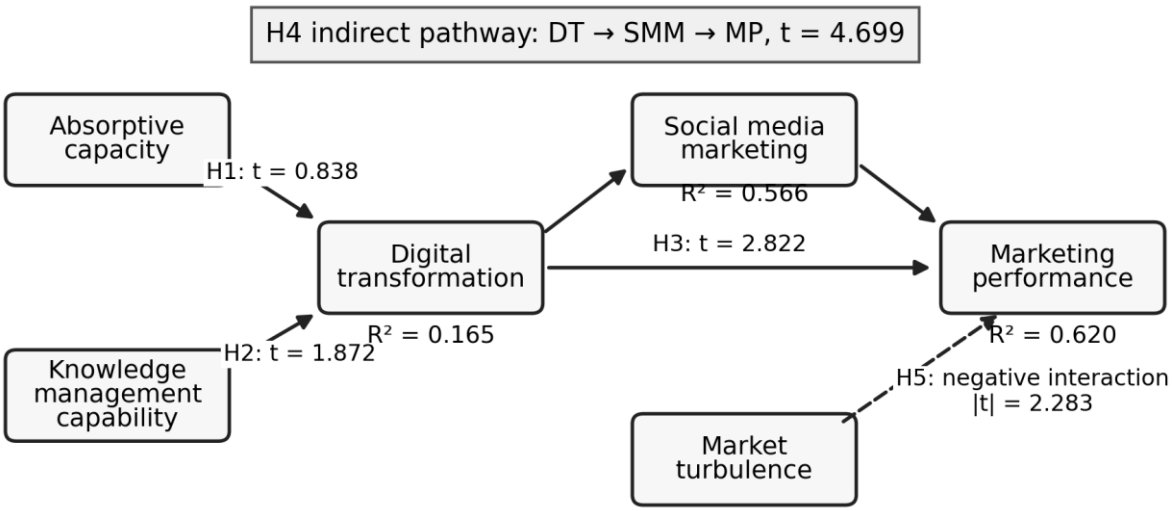

Figure 2. Structural relationships and available hypothesis test statistics

The schematic separates the antecedent knowledge-capability paths from the marketing outcome paths. Absorptive capacity and knowledge management capability each point toward digital transformation in the tested model. Digital transformation connects with

marketing performance directly and through social media marketing. The box at the top records the significance test for the specified indirect pathway rather than implying that its t-statistic belongs to either constituent path. Market turbulence is represented as an interaction with digital transformation, for which the reported effect direction was negative. The figure distinguishes hypothesis-test statistics from standardized path coefficients. Table 6 brings together the results for all five hypothesized relationships and their associated test statistics.

Table 6. Consolidated results of hypothesis tests (5,000 bootstrap subsamples)

Hypothesis	Tested relationship	t-statistic	p-value	Outcome
H1	AC → DT	0.838	0.402	Not supported
H2	KMC → DT	1.872	0.061	Not supported
H3	DT → MP	2.822	0.005	Supported
H4	DT → SMM → MP	4.699	< 0.001	Supported
H5	MT × DT → MP	2.283	0.022	Negative; opposite to proposed positive direction

H1 and H2 were not statistically supported at the 5% level. H3 showed a statistically significant positive association between digital transformation and marketing performance. H4 showed a statistically significant positive indirect pathway through social media marketing. H5 was statistically significant but ran in the negative direction, contrary to the original positive hypothesis. The p-value for H4 is shown as $p < .001$, consistent with conventional statistical reporting. The reported t-statistics provide evidence about statistical significance but do not, by themselves, quantify the strength of the estimated associations.

4. Discussion

The first substantive result was the absence of a statistically significant association between absorptive capacity and digital transformation among the surveyed workshops ($t = 0.838$, $p = .402$). The measure of absorptive capacity originally addressed acquiring, assimilating, transforming, and exploiting external knowledge, yet the retained indicators covered only part of the initial instrument. Research has positioned absorptive capacity as a potential basis for adaptation and transformation (Miroshnychenko et al., 2021; Siachou et al., 2021), making the nonsignificant result important rather than anomalous. A plausible sector-specific interpretation is that workshop owners and mechanics may use external information primarily for technical repairs rather than for redesigning customer-management and digital business processes. Studies of SME technological change emphasize that strategic orientation and organizational arrangements determine how learning is put into practice (Cvijić Čović et al., 2023; Lang et al., 2023). This explanation is not an observed mechanism in the present survey and should not be read as evidence that all Indonesian repair shops prioritize technical learning over digital innovation.

Knowledge management capability likewise had no statistically significant relationship with digital transformation at the specified threshold ($t = 1.872$, $p = .061$). The result suggests that the hypothesized relationship could not be established in this sample, not that organizational knowledge systems lack any possible value. In a workshop, knowledge about fault diagnosis, parts inventories, service histories, and customer complaints may be scattered among individuals or handwritten records rather than integrated into a reusable system. Knowledge-management scholarship distinguishes the possession of information from the infrastructure and routines needed to deploy it (Gold et al., 2001; de Bem Machado et al., 2022). Recent SME work also indicates that digital maturity, management capability, and access to financial

resources need not move together (Nasiri et al., 2022; Al Koliby et al., 2024; Asad, 2024). The limited two-item final measure of KMC further constrains what this nonsignificant estimate can say about the broader knowledge-management construct.

In contrast, digital transformation was positively associated with marketing performance ($t = 2.822$, $p = .005$), consistent with the relationship proposed in H3. The result is compatible with research connecting digital business capabilities to customer value creation, service renewal, and firm outcomes (Cioppi et al., 2023; Matarazzo et al., 2021; Verhoef et al., 2021; Chen et al., 2024). In automotive repair shops, electronic service histories, online booking, and digital payments offer practical ways to reduce coordination friction and maintain contact with customers, although these examples were not separately tested as mechanisms. Research on digital business model change suggests that operational adoption becomes strategically useful when it is accompanied by complementary organizational action (Danuso et al., 2022; Demeter et al., 2023; Aghazadeh et al., 2023). The marketing-performance model explained 62.0% of observed variance in the present sample, but that R^2 was attributable to multiple predictors and an interaction, not to digital transformation alone. As a result, the findings support an association within the specified model rather than a causal assertion that digital transformation by itself increased workshop revenue or market share.

The significant indirect pathway through social media marketing ($t = 4.699$, $p < .001$) indicates a potential mechanism linking digital transformation with marketing performance. This finding is consistent with an interpretation of social media as a customer-relationship capability rather than merely a channel for displaying advertisements (Trainor et al., 2014; Li et al., 2021; Li et al., 2023; Bartoloni & Ancillai, 2024). Repair shops can use social platforms to explain maintenance needs, display completed work with appropriate permission, respond to enquiries, and maintain communication after service. Empirical studies link firms' social media activities with business value and performance, but also show the importance of strategy, content and organizational context (Foltean et al., 2019; Dolega et al., 2021; Lin et al., 2021; Martín-Rojas et al., 2021; Drossos et al., 2023). Related work has connected social media adoption and entrepreneurship with innovation, opportunity identification, and routine development (Fang et al., 2021; Ghouri et al., 2022; Troise et al., 2022). The present analysis does not disclose the direct constituent coefficients of the indirect pathway, however, so the precise magnitude or proportion mediated cannot be calculated from the supplied t-statistic alone.

Market turbulence significantly moderated the digital transformation–marketing performance relationship, but in the opposite direction to that hypothesized ($t = 2.283$, $p = .022$). The negative interaction indicates that greater turbulence was associated with a weaker positive relationship between digital transformation and marketing performance. This conditional result contrasts with assumptions that environmental change invariably increases the value of dynamic capabilities. Studies of entrepreneurial marketing and business resilience show that external dynamism can create both opportunities and pressures, depending on resources and adaptability (Sulaiman et al., 2024; Al Omoush et al., 2023; Corvello et al., 2023). For repair shops, changing vehicle technology and service demand may require diagnostic equipment and specialized skills beyond online communication or administrative digitization. That is a plausible interpretation, not a measured pathway, and the reported moderation effect size was small ($f^2 = 0.036$), so the practical strength of this interaction should not be overstated.

The pattern across hypotheses also calls attention to the distinction between digital adoption and coordinated capability deployment. Internal knowledge variables were not statistically

associated with DT, whereas DT was associated with MP directly and through SMM; these results can coexist if the constructs capture different stages of organizational activity. Studies of technological risk and adaptation caution that resource constraints may shape implementation independently of the appeal of digital tools (Al Koliby et al., 2023; Tamvada et al., 2022; Zhang et al., 2022; Sagala & Őri, 2024). Strategic and human-capital research likewise suggests that technology-related change can depend on staff capabilities, agility, and knowledge transfer (Ramadan et al., 2023; Bastone et al., 2024; Nadeem et al., 2024). Digital marketing research indicates that customer engagement can create value even in firms whose back-office routines remain less developed (Sakas et al., 2022; Nichifor et al., 2022; Urdea et al., 2021). These studies provide possible explanatory lenses, not confirmatory evidence for unmeasured workshop practices in the current dataset. The findings are therefore best understood as an account of relationships among the operationalized constructs at a single point in time.

The results also differ in meaningful ways from earlier work and therefore help define the boundaries of generalization. Amin et al. (2025) examined digital transformation, social media marketing, turbulence, and SME marketing performance in Pakistan and did not establish the same negative interaction reported for Indonesian repair shops. Work emphasizing resilience and adaptive agility suggests that the consequences of market dynamism depend on firms' strategic resources and implementation pathways (Annarelli & Palombi, 2021; Setia et al., 2024; Hokmabadi et al., 2024). Related digital-transformation research documents heterogeneous applications across organizations and sectors (Kraus et al., 2022; Al-Swidi et al., 2024). These differences make sector and country context relevant, but the available survey cannot isolate which contextual feature explains divergent results. The near-exclusive representation of owners and concentration of participants on Java further caution against projecting the estimated paths to all Indonesian automotive workshops.

The statistical presentation adds an important methodological boundary to the substantive conclusions. Removing 12 of 29 indicators improved the reported AVEs and outer loadings, but three constructs were then represented by only two items, and two Cronbach's alpha values remained below commonly used benchmarks. The diagonal square-root-of-AVE values cannot independently establish the Fornell–Larcker comparisons without the corresponding interconstruct correlations. Methodological reviews recommend transparent measurement evaluation, reporting of uncertainty, and caution when conclusions depend on a modified measurement model (Sarstedt et al., 2022; Bozionelos & Simmering, 2022). Consequently, the observed positive and negative relationships should be treated as estimates based on the final 17-item model, not as definitive properties of all facets of the six theoretical constructs. Additional studies using prospectively specified scales, fuller discriminant-validity information, and broader sampling can clarify whether these associations are robust and generalizable.

5. Conclusion and Practical Implications

Within the final 17-indicator model estimated from 227 Indonesian automotive repair shop MSME respondents, absorptive capacity and knowledge management capability were not significantly associated with digital transformation, while digital transformation was positively associated with marketing performance. Social media marketing showed a significant positive indirect relationship between digital transformation and marketing performance. Market turbulence displayed a significant negative interaction with digital

transformation, contrary to the hypothesized positive moderating role. Taken together, the findings suggest that customer-facing application of digital capabilities may be more directly associated with reported marketing outcomes than the knowledge-related antecedents assessed in this sample. They do not demonstrate that implementing technology will cause performance gains in all workshops.

For managers, the practical implication is to connect digital administrative systems, service records, and booking facilities with clear customer communication and credible service delivery. Social media activities may be more useful when they share accurate information and support ongoing relationships than when they function only as periodic promotion. Workshops facing rapidly changing vehicle technologies may also need to consider the adequacy of diagnostic tools, staff skills, and service resources alongside their digital marketing activity. These recommendations are interpretations grounded in the model and the industry context, rather than interventions whose effectiveness was experimentally tested.

6. Limitations and Future Research

The study used a cross-sectional online survey, so it cannot establish the sequence or causality of the reported relationships. Most respondents were located on Java Island, and the sample should not be presumed to be nationally representative. Substantial post hoc indicator removal narrowed the operationalization of several constructs, and the results do not include a complete set of structural coefficients, confidence intervals, or HTMT statistics. Future research should test a content-valid instrument across more geographically diverse repair shop MSMEs, report full measurement and structural diagnostics, and examine the proposed mechanisms using longitudinal or other designs that can clarify change over time. The small negative moderation estimate also warrants replication under varying market conditions.

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