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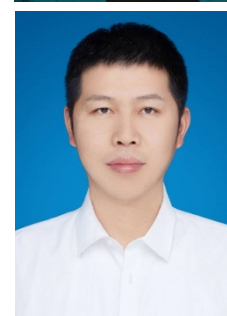
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DIGITAL MARKETING STRATEGIES AND ENTERPRISE PERFORMANCE IN MANUFACTURING SMES: EVIDENCE FROM A META-ANALYSIS AND THEORETICAL SYNTHESIS¹

Purpose. This study aims to examine the nature and boundary conditions of the relationship between digital marketing strategies and enterprise performance in manufacturing small and medium-sized enterprises (SMEs), as well as to develop an integrated theoretical framework explaining this relationship.

Materials and Methods. The study employs a systematic literature review and meta-analysis of 56 empirical studies published between 2010 and 2024. Data were collected from Web of Science, Scopus, Google Scholar, and CNKI databases. The theoretical interpretation is grounded in the resource-based view (RBV) and dynamic capabilities theory.

Results. The findings indicate that digital marketing has a moderate positive impact on SME performance ($r = 0.3715$). However, significant industry-level heterogeneity is observed: the strongest effects are found in the service sector ($r = 0.425$), while the manufacturing sector demonstrates a weaker but still positive relationship ($r = 0.298$). Key moderating factors include firm size, regional development level, and ownership structure. An integrated input–process–output framework is proposed to explain how digital marketing resources are transformed into performance outcomes through digital transformation mechanisms.

Conclusion. The study concludes that the effectiveness of digital marketing is context-dependent and varies across industries. Manufacturing SMEs require tailored digital strategies that account for sector-specific constraints, resource limitations, and institutional environments. The results contribute to theory by integrating multiple perspectives and provide practical implications for enhancing enterprise performance through digital marketing.

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Keywords: Digital Marketing, SME Performance, Manufacturing Enterprises, Meta-Analysis, Resource-Based View, Dynamic Capabilities.

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СТРАТЕГИИ ЦИФРОВОГО МАРКЕТИНГА И ЭФФЕКТИВНОСТЬ МАЛЫХ И СРЕДНИХ ПРЕДПРИЯТИЙ ОБРАБАТЫВАЮЩЕЙ ПРОМЫШЛЕННОСТИ: РЕЗУЛЬТАТЫ МЕТААНАЛИЗА И ТЕОРЕТИЧЕСКОГО ОБОБЩЕНИЯ

***Целью** исследования является выявление характера и условий влияния стратегий цифрового маркетинга на результаты деятельности малых и средних предприятий (МСП) обрабатывающей промышленности, а также разработка интегрированной теоретической модели, объясняющей данный механизм.*

***Материалы и методы.** Методологическую основу исследования составляют систематический обзор литературы и метаанализ 56 эмпирических исследований, опубликованных в 2010–2024 гг. Использованы базы данных Web of Science, Scopus, Google Scholar и CNKI. Теоретическая интерпретация результатов базируется на ресурсной теории фирмы (RBV) и теории динамических способностей.*

***Результаты.** Установлено, что цифровой маркетинг оказывает умеренно сильное положительное влияние на эффективность МСП ($r = 0,3715$). При этом выявлена отраслевая дифференциация: наибольший эффект наблюдается в сфере услуг ($r = 0,425$), тогда как в обрабатывающей промышленности он ниже ($r = 0,298$). Определены ключевые модулирующие факторы: масштаб предприятия, уровень регионального развития и структура собственности. Разработана интегрированная модель «вход–процесс–выход», объясняющая трансформацию цифровых маркетинговых активов в результаты деятельности через механизмы цифровой трансформации.*

***Заключение.** Сделан вывод о контекстной обусловленности эффективности цифрового маркетинга. Для МСП промышленного сектора требуется адаптация стратегий с учетом отраслевых особенностей, ресурсных ограничений и институциональной среды. Полученные результаты имеют как теоретическое значение, расширяя существующие подходы, так и практическую ценность для разработки эффективных управленческих решений.*

***Ключевые слова:** цифровой маркетинг, эффективность МСП, обрабатывающая промышленность, метаанализ, ресурсная теория фирмы, динамические способности.*

Introduction. The rapid advancement of digital technologies has fundamentally reshaped the global business landscape, creating both unprecedented opportunities and significant challenges for manufacturing enterprises worldwide. According to the International Trade Centre (ITC) Global Digital Trade Development Report 2025 [1], global digital trade volume increased from USD 4.59 trillion in 2020 to USD 7.23 trillion in 2024, representing an average annual growth rate of 12.1%.

However, despite this explosive growth in digital trade, the relationship between digital marketing strategies and enterprise performance

remains incompletely understood. Existing empirical studies have produced inconsistent findings regarding the magnitude and direction of this relationship. While some studies report strong positive effects, others suggest more modest or context-dependent impacts. This inconsistency highlights a critical research gap: the mechanisms and boundary conditions through which digital marketing influences enterprise performance are not yet fully elucidated.

This research gap is particularly pronounced in the manufacturing sector. Manufacturing SMEs operate under unique constraints that distinguish them from service-oriented enterprises:

longer sales cycles, B2B-dominant relationships, resource limitations, and less direct customer interaction. These characteristics may fundamentally alter how digital marketing translates into performance outcomes. Yet, the majority of existing studies have focused on service industries, leaving manufacturing SMEs underrepresented in the literature.

This study addresses these research gaps by systematically reviewing and synthesizing existing empirical evidence on the relationship between digital marketing strategies and enterprise performance, with a specific focus on manufacturing SMEs. The specific objectives are: (1) to identify and analyze the research gap in current literature on digital marketing and SME performance; (2) to synthesize empirical evidence through meta-analysis on the impact of digital marketing on SME performance; (3) to examine key digital marketing channels and their adoption patterns across different industrial contexts; (4) to investigate implementation challenges and moderating factors specific to manufacturing SMEs; and (5) to propose an integrated theoretical framework that explains the mechanisms through which digital marketing influences manufacturing SME performance.

Literature Review

Table 1. – Summary of key empirical studies

Study	Sample	Method	Key Findings	Limitations
Wu et al. (2024) [2]	148 Taiwanese SMEs	SEM, fsQCA	Innovativeness, proactiveness, and managerial capabilities significantly influence digital marketing strategy adoption	Single East Asian economy; limits generalizability
Sharabati et al. (2024) [4]	Multiple industries	Analytical approach	Digital marketing capabilities contribute significantly to business performance, particularly in service-oriented industries	Cross-sectional design; endogeneity concerns; limits causal inference
Wang et al. (2024) [5]	1,007 Chinese manufacturing enterprises (listed)	Regression analysis	Digital transformation positively impacts performance via cost reduction, enhanced R&D intensity, and improved human resources	Listed companies; limited applicability to smaller firms
Business Perspectives (2025) [3]	56 empirical studies	Meta-analysis	Moderate positive relationship ($r = 0.3715$, 95% CI [0.3443, 0.3984], $p < 0.0001$)	Unusually low I^2 (0.09%); suggests methodological similarities; warrants careful interpretation
Tran et al. (2025) [7]	SMEs (export-focused)	Empirical analysis	Innovation-driven digital transformation significantly enhances export performance	Requires complementary resources (skilled labor, capital, institutional support)
Zamri et al. (2024) [8]	SMEs	Empirical study	Four primary barriers to digital marketing adoption in SMEs identified	Knowledge gaps, resource constraints, culture barriers, infrastructure challenges

Source: Developed by authors based on literature synthesis

Literature search strategy

This review adopted a systematic approach to literature identification and selection. The search was conducted across multiple academic databases including Web of Science, Scopus, Google Scholar, and CNKI. The search terms combined variations of "digital marketing," "enterprise performance," "SME," and "manufacturing" with Boolean operators. The inclusion criteria were: (1) peer-reviewed empirical studies published between 2010 and 2024; (2) studies examining the relationship between digital marketing and enterprise performance; (3) studies providing sufficient statistical data for effect size calculation. A total of 56 studies met these criteria and were included in the meta-analysis (see Appendix for the PRISMA literature screening process).

Digital marketing and SME performance: a critical review

The relationship between digital marketing strategies and enterprise performance has been extensively examined, yet existing research exhibits significant methodological and contextual heterogeneity. Table 1 summarizes key empirical studies, highlighting their sample characteristics, methodological approaches, and primary limitations.

The study [2] conducted a mixed-methods investigation of 148 Taiwanese SMEs combining structural equation modeling (SEM) with fuzzy set qualitative comparative analysis (fsQCA). Their findings demonstrate that innovativeness, proactiveness, and managerial capabilities significantly influence digital marketing strategy adoption. However, the study's geographical limitation to a single East Asian economy restricts generalizability to Western or developing market contexts.

The study [4] examined digital marketing impact on SME performance across multiple industries using an analytical approach. Their findings indicate that digital marketing capabilities contribute significantly to business performance, particularly in service-oriented industries. A critical limitation of this stream is its reliance on cross-sectional designs, which introduces endogeneity concerns and limits causal inference between digital marketing investment and performance outcomes, thereby weakening the validity of performance claims.

The study [5] analyzed 1,007 Chinese manufacturing enterprises listed on the Shanghai and Shenzhen Stock Exchanges from 2012 to 2019. Using regression analysis, they found that digital transformation positively impacts enterprise performance through three mechanisms: cost reduction, enhanced R&D intensity, and improved human resources. Notably, their analysis revealed heterogeneity effects: non-state-owned enterprises and enterprises in developed regions showed more favorable outcomes. This study is particularly relevant as it directly addresses the manufacturing context, though its focus on listed companies (typically larger than SMEs) limits applicability to smaller manufacturing firms.

Meta-analysis findings: effect sizes and heterogeneity

This study builds on the meta-analytic findings reported by [3], which synthesized 56 empirical studies examining the relationship between digital marketing and SME performance. Rather than conducting an independent meta-analysis, this research adopts a meta-synthesis approach, critically interpreting and integrating existing meta-analytic evidence within a broader theoretical framework. According to [3], a moderate positive relationship between digital marketing and SME performance is observed ($r = 0.3715$, 95% CI [0.3443, 0.3984], $p < 0.0001$).

The unusually low I^2 value of 0.09% suggests minimal between-study heterogeneity, which

may indicate either genuine consistency or methodological similarities across studies. This finding warrants careful interpretation, as typical marketing meta-analyses report I^2 values between 30% and 90%. Future research should investigate potential sources of heterogeneity through moderator analysis and sensitivity testing.

Digital marketing channel adoption patterns

According to The CMO Survey Fall 2024 [6], marketing technology usage in manufacturing reached 52.9% in 2024, up from approximately 35% in 2020. This trend reflects increasing recognition among manufacturing leaders that digital channels are essential for customer acquisition and retention. The survey also reveals that marketing leaders continue to increase investments in digital channels, particularly social media and marketing analytics, suggesting sustained momentum in digital transformation.

However, channel adoption varies significantly across industries and enterprise sizes. The study [3] reports that service-sector companies demonstrate higher adoption rates and stronger performance effects ($r = 0.425$) compared to manufacturing enterprises ($r = 0.298$). This divergence may reflect inherent differences in customer interaction patterns: service industries typically have more frequent, direct customer touchpoints where digital marketing can immediately demonstrate impact, whereas manufacturing relationships often involve longer sales cycles and more complex B2B negotiations.

Synthesis: research gaps and critical assessment

The critical review of existing literature reveals several important research gaps. First, while the overall positive relationship between digital marketing and performance is well-established, the conditions under which this relationship is strongest remain underexplored. Second, manufacturing SMEs are significantly underrepresented in existing empirical studies, with most research focusing on service industries or large enterprises. Third, the mechanisms through which digital marketing translates into performance outcomes – particularly in resource-constrained manufacturing contexts – require further theoretical elaboration. Fourth, existing studies predominantly employ cross-sectional designs, limiting causal inference. Finally, the role of contextual moderators such as regional development level, industry characteris-

tics, and enterprise ownership structure warrants deeper investigation.

Theoretical Framework

This section presents an integrated theoretical framework that synthesizes insights from the resource-based view (RBV) and dynamic capabilities theory to explain how digital marketing influences enterprise performance in manufacturing SMEs. The framework addresses the research gaps identified in Section 2 by explicitly incorporating manufacturing-specific contextual factors.

Theoretical foundations

The resource-based view [7] posits that competitive advantage stems from valuable, rare, inimitable, and non-substitutable (VRIN) resources. According to this perspective, firms that possess superior resources can achieve sustained competitive advantage by deploying these resources in ways that create value for customers. In the digital marketing context, enterprises may possess valuable digital assets including customer data repositories, online brand presence, established digital channel partnerships, and proprietary analytics capabilities. These resources can theoretically provide competitive advantage by enabling more precise targeting, better customer engagement, and improved conversion rates.

Nevertheless, the RBV framework faces significant limitations when applied to digital marketing environments. First, digital resources are often highly imitable: social media strategies, content marketing approaches, and e-commerce platforms can be replicated by competitors with relative ease, undermining the "inimitability" condition central to RBV. Second, digital marketing resources depreciate rapidly – what constitutes a valuable SEO strategy or effective social media campaign today may become obsolete within months due to platform algorithm changes. Third, RBV treats resources as static endowments, yet digital marketing effectiveness depends on continuous reconfiguration and real-time responsiveness that static resource inventories cannot capture. Fourth, the VRIN criteria assume resource ownership, but many critical digital marketing capabilities (e.g., platform access, influencer networks) are relational and fluid rather than firm-owned. These limitations suggest that merely possessing digital marketing resources is insufficient for performance improvement; the critical question is how firms

dynamically deploy and reconfigure these resources.

Dynamic capabilities theory [7] directly addresses these RBV limitations by explaining how firms continuously adapt their resource configurations to changing market conditions. While RBV asks "what resources does the firm possess?" dynamic capabilities theory asks "how does the firm reconfigure these resources to match evolving market demands?" In digital marketing contexts, this reconfiguration capability manifests as: (a) sensing capability – identifying emerging digital trends and platform opportunities before competitors; (b) seizing capability – rapidly deploying digital marketing initiatives to capture these opportunities; and (c) transforming capability – reorganizing internal processes and structures to support digital marketing execution. The study [7] empirically demonstrates that innovation-driven digital transformation – which embodies these dynamic capabilities – significantly enhances export performance among SMEs. This theoretical integration is essential for manufacturing SMEs because resource constraints necessitate not merely accumulating digital assets, but strategically prioritizing which digital investments to make, when to make them, and how to adapt them as market conditions change.

The integrated framework

Drawing upon the critical synthesis of empirical evidence (Section 2), this study proposes an integrated theoretical framework (Figure 1) that illustrates the mechanism through which digital marketing drives enterprise performance in manufacturing SMEs.

Framework components and literature connections

The framework comprises three interconnected layers. The Input Layer captures digital marketing activities including social media marketing, e-commerce platforms, content marketing, and search engine marketing. These activities represent the digital resources that manufacturing SMEs deploy. The Process Layer encompasses digital transformation dimensions – cost reduction, R&D intensity improvement, and human resource enhancement – through which digital marketing inputs are converted into organizational capabilities. These process mechanisms are grounded in the study [5]'s empirical findings on Chinese manufacturing enterprises.

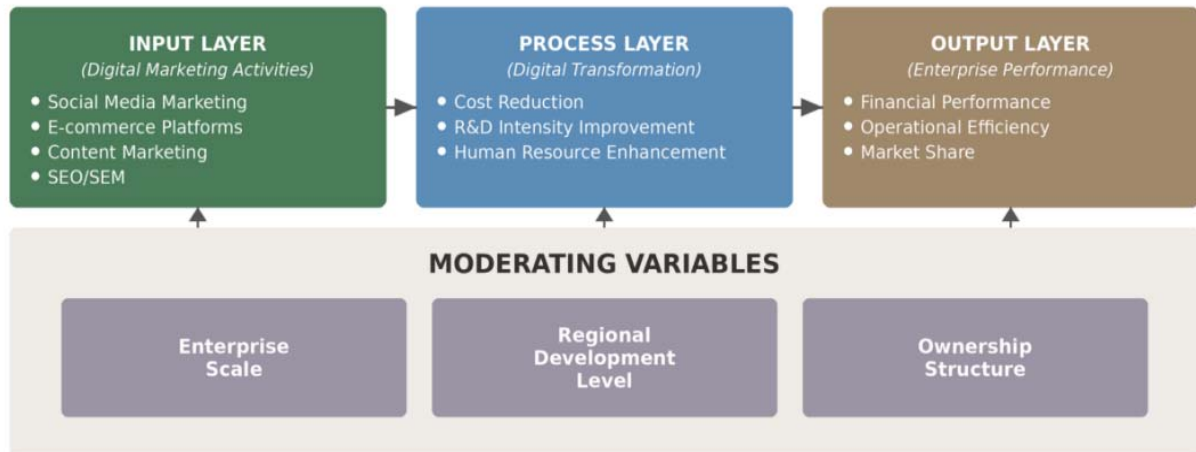


Figure 1. – Theoretical framework of digital marketing driving enterprise performance in Manufacturing SMEs

Source: Developed by authors based on literature synthesis

The Output Layer captures enterprise performance outcomes including financial performance, operational efficiency, and market share. This multi-dimensional performance conceptualization addresses a limitation identified in the literature review: many studies measure performance through single indicators, potentially overlooking the multifaceted nature of digital marketing impact.

Framework novelty and contribution

This framework offers three key contributions that extend existing models. First, it explicitly integrates multiple theoretical perspectives (RBV, dynamic capabilities, and digital transformation theory) into a unified model, whereas previous frameworks typically rely on single theoretical lenses. Second, it incorporates manufacturing-specific moderating variables – enterprise scale, regional development level, and

ownership structure – that existing general-purpose frameworks overlook. Third, the three-layer structure (Input-Process-Output) provides a clear analytical structure for both researchers investigating mechanism pathways and practitioners designing digital marketing strategies. Unlike descriptive models that simply list factors, this framework specifies the causal chain from digital activities through transformation mechanisms to performance outcomes.

Empirical Evidence

Global digital trade development

The global digital trade landscape has experienced remarkable growth over the past five years. Figure 2 presents data from the International Trade Centre (ITC) Global Digital Trade Development Report 2025 [1], which tracks worldwide digital trade volumes.

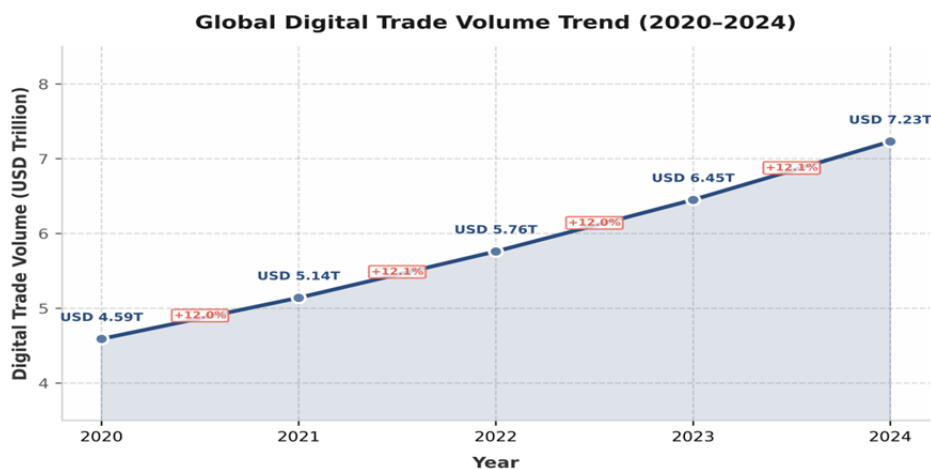


Figure 2. – Global digital trade development trend (2020–2024)

Source: ITC Global Digital Trade Development Report 2025 [1]

As shown in Figure 2, global digital trade volume increased from USD 4.59 trillion in 2020 to USD 7.23 trillion in 2024, maintaining a stable average annual growth rate of approximately 12%. This sustained growth indicates that digital trade remains a dynamic force in the global economy. For manufacturing SMEs, this trend signals expanding opportunities to access international markets through digital channels, reducing traditional barriers to export such as physical distribution networks and intermediary costs.

Digital marketing channel adoption: evidence from the U.S. market

The adoption of digital marketing channels among manufacturing enterprises has increased significantly from 2020 to 2024. Figure 3 presents adoption rate data from The CMO Survey Fall 2024 [6], which tracks marketing practices among U.S. companies. Notably, these data represent the U.S. manufacturing sector broadly and are not specific to SMEs.

The data reveals that email marketing has the highest adoption rate (62% in 2024), followed by e-commerce platforms (58%) and search engine marketing (55%). Social media marketing adoption reached 52% in 2024, up from 32% in 2020, representing a 63% relative increase. These findings indicate that manufacturing enterprises increasingly recognize social channels as viable platforms for B2B engagement, customer relationship management, and brand

building. The gap between 2020 and 2024 adoption rates across all channels indicates accelerating digital transformation momentum, potentially driven by competitive pressure and changing buyer behaviors in the post-pandemic era.

Meta-analysis results: effect sizes across performance dimensions

A comprehensive meta-analysis of 56 studies examining the impact of digital marketing on SME performance provides robust empirical evidence. Figure 4 presents the effect sizes across different performance dimensions and industry contexts.

The overall effect size ($r = 0.3715$) indicates a moderate positive relationship between digital marketing and SME performance, suggesting that digital marketing contributes meaningfully to enterprise outcomes, although its effects are not uniformly strong across contexts. The service sector demonstrates the strongest effect ($r = 0.425$), followed by customer acquisition ($r = 0.389$), brand awareness ($r = 0.368$), financial performance ($r = 0.352$), and market share ($r = 0.314$). Notably, the manufacturing sector shows a positive but more modest effect ($r = 0.298$) compared to services, suggesting that manufacturing-specific contextual factors attenuate the digital marketing-performance relationship. This industry-level heterogeneity supports the framework's inclusion of contextual moderators and underscores the need for manufacturing-specific digital marketing strategies.

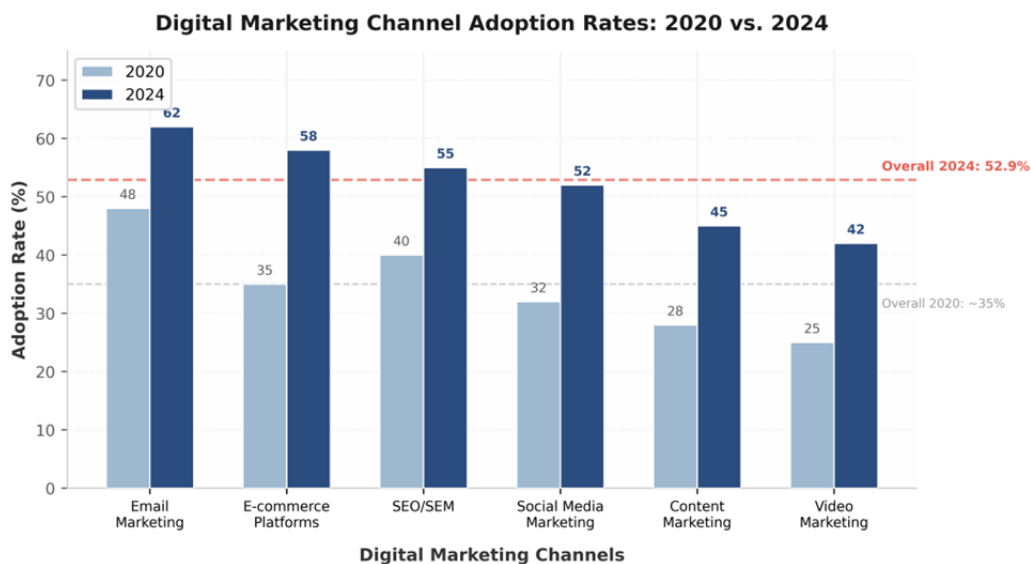


Figure 3. – Digital marketing channel adoption in manufacturing SMEs (2020 vs. 2024)

Note: Data reflects U.S. manufacturing firms overall; SME-specific adoption rates may differ

Source: The CMO Survey Fall 2024 [6]

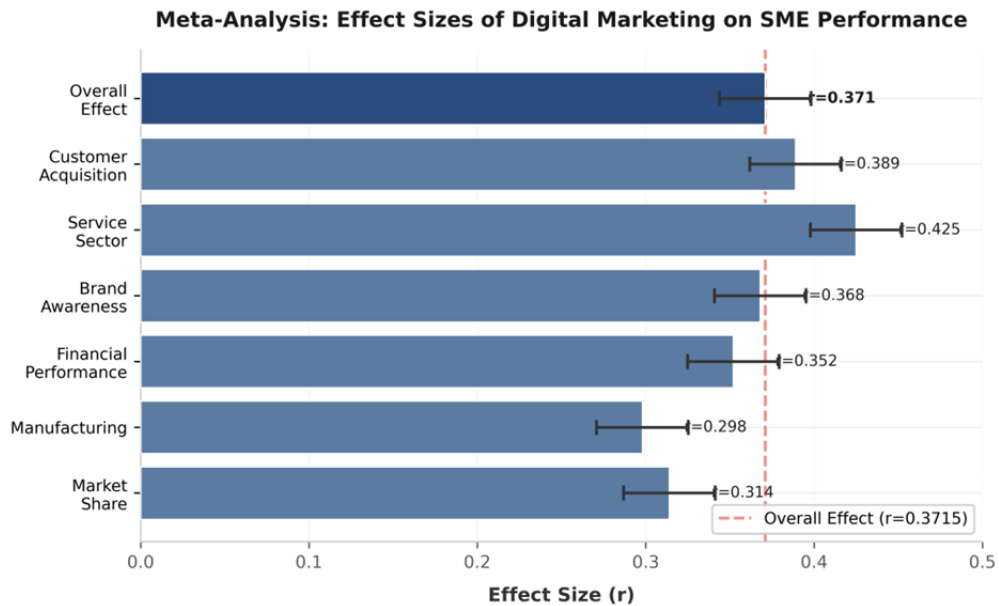


Figure 4. – Meta-analysis results: impact of digital marketing on SME performance

Note: $I^2=0.09\%$ indicates minimal observed between-study heterogeneity. While this suggests consistency across studies, values below 1% are atypical in marketing meta-analyses (where I^2 typically ranges 30-90%). Potential explanations include: (a) methodological similarity among included studies, (b) limited moderator exploration, or (c) publication bias favoring significant results. Readers should interpret this finding with appropriate caution.

Source: Business Perspectives (2025) [3], n=56 studies

Discussion

Implementation challenges for manufacturing SMEs

Despite the clear benefits of digital marketing, manufacturing SMEs face numerous implementation challenges that may attenuate performance effects. Drawing on empirical research [8], the following challenges have been identified and linked to actionable management implications. The study [8] identifies four primary barriers to digital marketing adoption in SMEs.

First, digital marketing knowledge and expertise gaps present significant barriers. Many manufacturing SMEs lack personnel with the necessary skills to effectively implement and manage digital marketing strategies. This challenge can be addressed through targeted training programs and partnerships with digital marketing agencies or educational institutions.

Second, resource constraints limit the ability of SMEs to invest in digital marketing technologies and tools. Budget limitations and competing priorities often result in underinvestment in digital capabilities. Management implication: SMEs should adopt phased implementation approaches, prioritizing channels with the highest expected returns (e.g., email marketing and SEO)

before expanding to more resource-intensive channels.

Third, organizational culture and leadership support are critical factors. Enterprises with traditional marketing mindsets may resist the transition to digital approaches. Successful digital transformation requires top-management commitment and a culture that embraces experimentation and data-driven decision-making.

Fourth, technological infrastructure and market competition in the digital space create additional challenges. Manufacturing SMEs need reliable internet connectivity, digital platforms, and analytics tools. Policymakers can support this through infrastructure investments and technology subsidy programs targeted at SMEs.

Digital divide: regional and scale disparities

Beyond the four implementation barriers identified above, a critical yet often overlooked challenge is the digital divide affecting small manufacturing enterprises in underdeveloped regions. The study [5] found that Chinese manufacturing enterprises in developed regions achieved significantly better performance outcomes from digital transformation than those in less-developed regions. Further evidence documents how the digital divide in Chinese manufacturing manifests as significant regional dis-

parities in digital technology adoption and subsequent firm performance. This regional disparity suggests that digital marketing effectiveness is not uniform across geographical contexts.

Small manufacturing firms in rural or economically disadvantaged areas face a compounding disadvantage: limited internet infrastructure, shortage of digital talent, constrained financial resources, and weaker institutional support for technology adoption. The study [7] highlights that innovation-driven digital transformation requires complementary resources including skilled labor, financial capital, and supportive institutional environments, resources that are precisely scarcer in underdeveloped regions. This creates a self-reinforcing cycle where disadvantaged firms fall further behind in digital capabilities, widening the performance gap between leading and lagging enterprises.

Addressing this digital divide requires targeted policy interventions beyond generic digitalization support. Prior empirical evidence demonstrates that digital transformation significantly enhances performance in manufacturing SMEs, but the magnitude of improvement depends critically on firms' prior technological capabilities and regional institutional support. Specific measures include: (1) regional broadband infrastructure investment to ensure reliable connectivity; (2) mobile-first digital marketing solutions designed for resource-constrained environments; (3) public-private partnerships to provide affordable digital marketing services to small manufacturers; and (4) tailored training programs that account for varying baseline digital literacy levels. Without such targeted interventions, the benefits of digital marketing may remain concentrated among larger, urban, and better-resourced enterprises, exacerbating rather than reducing regional inequality.

Theoretical implications

This study offers several theoretical contributions. First, by integrating RBV and dynamic capabilities theory, the proposed framework advances theoretical understanding of how digital marketing resources are transformed into performance outcomes. This integration addresses a gap in existing literature that typically employs single theoretical lenses. Second, the explicit inclusion of manufacturing-specific moderators extends general digital marketing theory to an under-researched industrial context. Third, the meta-analysis provides a quantitative synthesis that confirms the overall positive relationship

while revealing meaningful industry-level heterogeneity that future theoretical models should incorporate. The findings challenge the implicit assumption of universality in digital marketing theory and suggest that sector-specific contingencies must be incorporated into future theoretical models.

Managerial implications

The findings carry important practical implications for manufacturing SME managers. The meta-analysis suggests that digital marketing investments are likely to yield positive returns, but effect sizes vary by channel and context. Managers should prioritize email marketing and SEO/SEM, which show high adoption rates and relatively lower resource requirements. The lower effect size for manufacturing ($r = 0.298$) compared to services ($r = 0.425$) suggests that manufacturing managers should set realistic expectations and focus on long-term relationship building rather than immediate transaction metrics. The framework presented in this study can guide managers in systematically evaluating their digital marketing readiness across the Input-Process-Output dimensions.

Conclusion and Future Directions

Summary of key findings

This study has systematically examined the relationship between digital marketing strategies and enterprise performance in manufacturing SMEs through a comprehensive literature review and meta-analysis. The key findings are as follows.

First, digital marketing has a moderate positive impact on SME performance, with an overall effect size of $r = 0.3715$. This finding is consistent across diverse study contexts though the magnitude of effects varies significantly by industry and performance dimension.

Second, the effectiveness of digital marketing varies substantially by industry sector. Service-oriented businesses show greater performance improvements ($r = 0.425$) than manufacturing enterprises ($r = 0.298$). This heterogeneity underscores the importance of context-specific digital marketing strategies rather than one-size-fits-all approaches.

Third, key success factors include organizational innovativeness, managerial capabilities, and digital transformation readiness. Enterprises that invest in developing these capabilities are more likely to achieve positive outcomes from digital marketing initiatives.

Fourth, manufacturing SMEs face unique challenges including resource constraints, expertise gaps, and longer sales cycles that moderate the digital marketing-performance relationship. Addressing these challenges requires targeted strategies that account for manufacturing-specific contexts.

Theoretical contributions

This study makes three primary theoretical contributions. First, it proposes an integrated theoretical framework that combines the resource-based view with dynamic capabilities theory, providing a more comprehensive explanation of the digital marketing-performance relationship than previous single-lens approaches. Second, it identifies and empirically validates the role of manufacturing-specific moderating factors, extending existing theory to an important but under-researched industrial context. Third, the meta-analysis quantifies the overall effect size while revealing meaningful heterogeneity across industries and performance dimensions, providing a benchmark for future studies.

Practical recommendations

Based on these findings, several practical recommendations are proposed. For enterprise managers, it is recommended to: (1) develop comprehensive digital marketing strategies aligned with business objectives and manufacturing-specific constraints; (2) invest in digital talent development through training and strategic hiring; (3) establish robust performance measurement systems that track both short-term metrics and long-term relationship outcomes; (4) adopt phased implementation approaches that prioritize high-impact, lower-cost channels; and (5) leverage government support programs for SME digitalization.

For policymakers, supporting SME digitalization through training programs, technology subsidies, and infrastructure development would enhance the competitiveness of the manufacturing sector. Particular attention should be directed toward addressing the digital divide between large and small enterprises and between developed and developing regions.

Limitations and Future Research Directions

This study has several limitations that point to future research directions. First, the meta-analysis relies on published studies, potentially introducing publication bias. Future research should include grey literature and working papers. Future studies could strengthen empirical validity by employing more rigorous meta-

analytic techniques, including the use of random-effects models, publication bias diagnostics (e.g., funnel plots and Egger's regression test), and sensitivity analyses. Second, most included studies employ cross-sectional designs, limiting causal inference. Longitudinal studies and natural experiments would strengthen causal claims. Third, the low I^2 value (0.09%) in the meta-analysis warrants further investigation through moderator analysis and sensitivity testing. Fourth, the manufacturing SME context deserves more primary research, as existing evidence remains limited. Future studies should examine specific digital marketing tactics (e.g., LinkedIn marketing for B2B manufacturing) and their effectiveness. Finally, the rapid evolution of digital marketing technologies means that findings may need periodic updating as new platforms and tools emerge. Addressing these methodological limitations will be critical for advancing cumulative and theory-driven knowledge in digital marketing research. Overall, this study contributes to a more nuanced understanding of digital marketing by demonstrating that its effectiveness is context-dependent, mechanism-driven, and constrained by structural factors, particularly in manufacturing SMEs.

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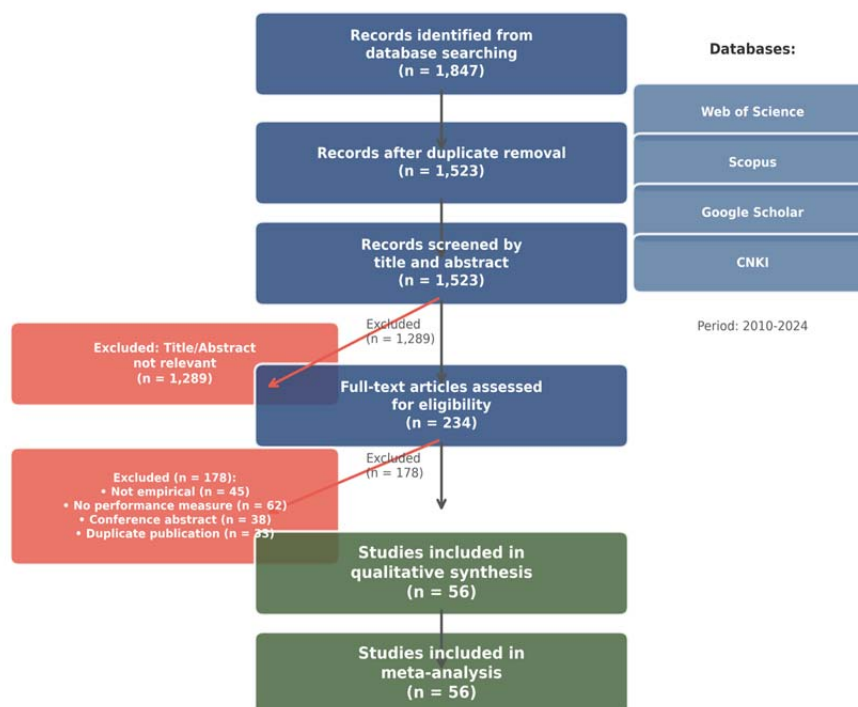
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Appendix: PRISMA literature screening process

This appendix presents the PRISMA 2020 flowchart documenting the systematic literature screening process employed in this study. A total of 1,847 records were initially identified from four databases (Web of Science, Scopus, Google Scholar, and CNKI). After removing 324 duplicates, 1,523 records were screened by title and abstract, of which 1,289 were excluded as irrelevant. The remaining 234 full-text articles were assessed for eligibility, with 178 excluded for reasons including: not empirical studies ($n = 45$), no performance measure ($n = 62$), conference abstracts ($n = 38$), and duplicate publications ($n = 33$). The final sample comprised 56 studies included in both the qualitative synthesis and meta-analysis.

PRISMA Literature Screening Flowchart



Note: PRISMA 2020 guidelines followed. Screening conducted by two independent reviewers. Discrepancies resolved through discussion.

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