Binus Business Review, 17(2), July 2026, 185−198.
DOI: 10.21512/bbr.v17i2.14477
P-ISSN: 2087-1228
E-ISSN: 2476-9053

Driving Marketing Performance Through Innovation and Differentiation: The Mediating Role of Technological Capability in Small Metal Firms

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Received: 01st October 2025/ **Revised:** 12th February 2026/ **Accepted:** 12th February 2026

How to Cite: Gunistiyo, & Prihadi, D. (2026). Driving marketing performance through innovation and differentiation: The mediating role of technological capability in small metal firms. *Binus Business Review, 17*(2), 185−198. https://doi.org/10.21512/bbr.v17i2.14477

ABSTRACT

Small firms in traditional manufacturing industries face significant resource constraints that undermine the direct translation of innovation and differentiation strategies into marketing performance, thereby requiring technological capability as a supporting mechanism in the proposed model. Although prior studies emphasize innovation, service quality, and differentiation, the mechanism linking these orientations to performance remains underexplored, particularly in small industrial firms. The research investigates how technological capability mediates the effects of product innovation, service quality, and differentiation on marketing performance in small metal firms. The novelty of the research lies in positioning technological capability as an enabling mechanism that amplifies the impact of product innovation and differentiation in traditional metal manufacturing contexts. Drawing on the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), the proposed model explains how small firms reconfigure limited resources through technological capability. Using purposive sampling, data from 150 small metal firms are analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) with a reflective measurement model. The results show that product innovation, differentiation, and technological capability significantly improve marketing performance, whereas service quality does not. Technological capability mediates the effects of product innovation and differentiation but not service quality, underscoring its central role in resource-constrained manufacturing settings. The research advances a capability-based mediation framework, offering a clearer explanation of how strategic initiatives translate into marketing performance without generalizing findings to medium-sized firms or broader Micro, Small, and Medium Enterprises (MSMEs) sustainability contexts.

Keywords: innovation, differentiation, service quality, technological capability, marketing performance

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a vital role in the economic development and expansion of a country, both in developing and developed countries (Ramadani et al., 2025; Lubis & Salsabila, 2024). MSMEs account for more than 90% of the business sector worldwide and are responsible for creating around 60-70% of job opportunities and contributing around 50% to global GDP (Setiawati & Mastarida, 2024). Official information released by the Ministry of Cooperatives and SMEs shows that MSMEs contribute around 62.3% to Gross Domestic Product (GDP) and employ more than 117 million workers, equivalent to around 97% of the national workforce (Limanseto, 2025).

In the research, the term "small business" is used to refer to businesses that fall under the broader category of MSMEs, with a particular focus on small-scale manufacturing companies, one of which is

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the small metal firm, which produces a wide range of products, from automotive parts and agricultural equipment to household appliances (Gunistiyo et al., 2021). Tegal Regency is known for its metal processing industry and is often referred to as the "Japan of Indonesia," reflecting its capability and historical role in the manufacturing supply chain (Sutjiatmi et al., 2023). However, this reputation is now facing increasingly intense competition, both from local manufacturers who continue to innovate and from global pressures that demand greater efficiency and technological capabilities. Fierce competition requires implementing efficient marketing strategies to prevent losses, with an emphasis on increasing sales, driving growth, and expanding market share (Chalirafi et al., 2024).

Marketing performance is also used to measure the effectiveness of strategies involving product innovation. Product innovation plays a vital role in improving marketing effectiveness, thereby generating added value and meeting consumer needs and desires. Continuous product innovation enables companies to strengthen competitive advantage and increase customer satisfaction in dynamic market conditions (Nurjaya et al., 2021; Prastowo & Rahmadi, 2022). MSMEs are often seen as innovative organizations that are better at creating, transferring, and utilizing product innovations than large companies (Suharti et al., 2024). Product innovation is an important element in growth strategies aimed at penetrating new markets (Qu & Mardani, 2023; Wati & Muis, 2025), increasing current market share, and providing a competitive advantage for MSMEs (Larios-Francia & Ferasso, 2023).

MSMEs that want high marketing performance while maintaining competitiveness amid fierce market competition can implement a differentiation strategy (Gunadi et al., 2024). This strategy involves offering products and services that are different, unique, valuable, and high-quality compared to similar products offered by other businesses (Kartajaya, 2002). Differentiation emerges as a response to customer needs for more diverse and unique product alternatives (Pradipta et al., 2023). Differentiation protects companies from competitors' offensive moves by increasing loyalty and reducing price sensitivity (Khan, 2023; Al-Khatib & Al-Ghanem, 2022). Product innovation and differentiation provide a more viable strategic path for small metal companies, as these strategies rely on craftsmanship, design enhancement, customization, and technical flexibility, which are the core strengths of this sector, compared to cost leadership, requiring economies of scale, standardized processes, and substantial capital investment.

Along with product innovation and differentiation, the provision of high-quality services significantly contributes to improved marketing performance through referrals, concept generation for product development, and social support (Hollebeek & Belk, 2021). Service quality is seen as a strategic foundation for marketers, as it can increase customer satisfaction and directly improve marketing performance (Rohit et al., 2025). Small industries have relatively homogeneous product characteristics, making it difficult to differentiate them based solely on physical aspects. Service quality is a strategic differentiator and can add value to customers through friendliness, ease of communication, and quick responses to complaints, all of which can create a positive consumer experience (Shin et al., 2024; Lu et al., 2023).

Technological capabilities also play an important role in supporting the marketing performance of MSMEs (Valdez-Juárez & Castillo-Vergara, 2021). Technological capabilities involve various human, equipment, and financial resources to achieve efficiency (Kim et al., 2024; Sony et al., 2023). The development of an institution depends on its technological capabilities and its ability to adopt new technologies applied in its operations (Kumalasari & Fontana, 2024).

Previous studies in the small firm literature have examined innovation, differentiation, and market-oriented strategies as key drivers of company performance (Miroshnychenko et al., 2021). Several small-firm studies also highlight that strategic orientations such as innovation and customer-focused differentiation contribute to competitive outcomes, although the organizational capabilities underlying these strategies remain underexplored (Najafi-Tavani et al., 2023). These findings confirm the relevance of this business model in the small-firm context while also indicating the need to investigate capability-based mechanisms, particularly in traditional manufacturing environments such as small metal companies.

Previous empirical findings on the correlation between product innovation and the marketing performance of small firms are still diverse and inconsistent because small firms generally have limited capital. In contrast, innovation requires substantial resource support (Expósito & Sanchis-Llopis, 2019). Furthermore, successful innovators must possess specific capabilities that enable their innovations to have a tangible impact on marketing performance. However, many small firms still face limitations in this regard (Febrianti, 2025; Probohudono et al., 2025).

Several studies have found that small firms in implementing differentiation strategies can improve marketing performance through product appeal and increased market position (Aldania & Niswah, 2021). Differentiation strategies lead to higher marketing performance than Porter's other two generic strategies (low-cost or focus) and have a positive impact. However, some studies show that differentiation alone does not guarantee financial success, especially when businesses fail to align their strategies with innovation and technological advances. Companies need to continuously adapt their differentiation strategies to changing market trends and consumer preferences in order to sustain competitive advantage and improve overall business performance (Latifah et al., 2021; Satpathy et al., 2025). This research presents important benefits grounded in Dynamic Capabilities Theory (DCT) and Resource-Based View (RBV). The proposed framework is examined from the perspective that innovation, service, and differentiation, supported

by technological capabilities, enhance marketing performance. This business model is generally studied and adopted by large, high-tech companies (Sony et al., 2023) and has not been studied in MSMEs. The research provides vital empirical insights by analyzing aspects of technological capabilities in MSMEs, given their significant contributions to the economic and social sectors, particularly in the small-scale metal industry.

The research aims to explore the impact of product innovation, differentiation, service quality, and technological capability on the marketing performance of small metal firms (see Figure 1). Furthermore, the research examines how product innovation, differentiation, and service quality affect marketing performance while accounting for the mediating role of technological capability. The research also provides important insights for stakeholders who need this information to formulate strategic policies.

Recent studies have increasingly examined how innovation, differentiation, and service quality influence firm performance. However, most research still focuses on direct-effect models and on medium-sized or technology-intensive firms, leaving limited evidence from resource-constrained traditional manufacturing sectors, such as small metal firms (Qu & Mardani, 2023; Pradipta et al., 2023). Furthermore, although technological capability has been recognized as a dynamic capability, previous studies on small firms have tended to treat it as an independent predictor rather than as a mediating mechanism that translates strategic initiatives into performance outcomes (Probohudono et al., 2025; Purmono, 2023). To address this gap, the researchers offer a novel approach by developing a capability-based mediation framework that positions technological capability as a mechanism linking product innovation, service quality, and differentiation to marketing performance. It also contributes by focusing specifically on small metal manufacturing firms, an underexplored yet economically significant sector. Hence, it provides context-specific evidence that broadens current understanding of how small traditional firms translate limited resources into marketing performance.

Product innovation plays an important role in business sustainability. Therefore, business owners must demonstrate a willingness to take business risks to drive greater innovation and achieve competitive advantage (Salfore et al., 2023). Business actors can apply new techniques in product creation through innovation, thereby ensuring their future business success (Tereshchenko et al., 2024). Product innovation enables small firms to meet evolving customer needs and increase competitiveness in local and global markets, making innovation an important element in ensuring marketing performance (Wijaya et al., 2025). Consistent innovation is essential for adapting to consumer needs (Suharti et al., 2024). Other studies have found that the more innovative the product, the greater its impact on performance development (Kebede et al., 2024; Wati & Muis, 2025). The first hypothesis is as follows:

H1: Product innovation influences the marketing performance of small metal firms.

Differentiation involves developing unique products or services that are different from those offered by competitors (Islami et al., 2020). According to Porter (1980), when a product or service has unique qualities, customers are more likely to remain loyal to the brand and show a willingness to pay a higher price for its offerings. The uniqueness of a product or service reflects an institution's creative capabilities. It implies that the success of a differentiation strategy depends on the organization's ability to innovate in ways to make the product stand out (Pradipta et al., 2023). The relationship between organizational performance and the benefits companies, deriving from implementing differentiation

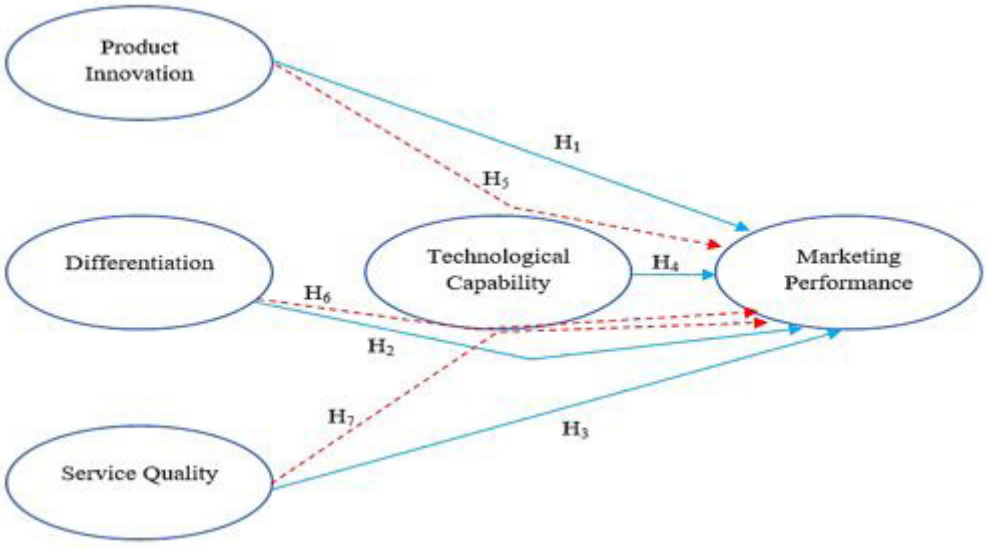


Figure 1 Research Framework

strategies, is outlined. This correlation is characterized by an increase in revenue relative to competitors, which is caused by factors such as brand loyalty, product quality, and customer perceptions of the institution's offerings (Febrianti, 2025). Effective differentiation demonstrates increased product adaptability, reduced costs, superior service provision, increased convenience, or additional features that align with customer expectations and improve marketing outcomes (Dewangga & Layman, 2023). The second hypothesis is proposed as follows:

H2: Differentiation influences the marketing performance of small metal firms.

Service quality is increasingly recognized as a determinant of an institution's ability to maintain customer satisfaction, customer loyalty, and marketing performance (Lu et al., 2023; Irawan & Sudarmiatin, 2024). High-quality service, characterized by tangibility, reliability, responsiveness, assurance, and empathy, has the potential to increase customer satisfaction. This increase in satisfaction further increases the likelihood of repeat purchases and positive word-of-mouth referrals. These factors, in turn, have a direct effect on marketing performance, which manifests itself in increased sales volume, expanded market share, and improved effectiveness of promotional initiatives (Kankam-Kwarteng et al., 2021). Previous empirical studies show that small firms that maintain and improve service quality gain a competitive advantage over competitors, thereby improving their marketing performance (Kankam, 2023; Bado & Dunakhir, 2024). Companies need to consistently improve and refine their services to keep pace with changing customer needs and preferences. The third hypothesis is as follows:

H3: Service quality influences the marketing performance of small metal firms.

Technological capability refers to an organization's proficiency in utilizing capital, which includes financial and human resources, to improve operational efficiency (Heredia et al., 2022). This capability encompasses practical and theoretical knowledge, which helps organizations to refine existing products and innovate new ones (Purmono, 2023). Technological capability can be defined as an organization's talent for designing and developing new processes and products, while also developing knowledge and skills related to the work environment in a distinctive way (Heredia et al., 2022). This acquired knowledge is then converted into instructions and designs that facilitate more effective performance. Thus, technological capability is not only related to technical mastery but also includes the ability to expand and apply an institution's core competencies, integrate various technological resources, and effectively mobilize capital throughout the organization (Caputo et al., 2022).

Technological capabilities empower organizations to recognize, acquire, and utilize new external knowledge to improve operational competencies, thereby facilitating organizations in achieving superior performance. For small firms, technological capabilities are an important foundation for surviving business environment fluctuations, from the initial phase of business to its expansion. Successful advancement of technological capabilities requires openness to technological innovation, continuous knowledge accumulation, and the implementation of appropriate contemporary technologies to improve small firm marketing performance (Heredia et al., 2022; Ciampi et al., 2021). The fourth hypothesis is as follows:

H4: Technological capabilities influence the marketing performance of small metal firms.

Organizations need one or more competitive strategies to achieve competitive advantage, build sustainability, innovate in product offerings, maintain customer loyalty, and improve overall performance. It is crucial for organizations to improve their marketing effectiveness alongside the development of new products and services (Sivaslioğlu et al., 2021). Innovation is carried out to differentiate and develop marketing methods that respond to customer desires and expectations, and to improve existing ones. Differentiation strategy is one of the strategies that must be implemented to achieve a competitive advantage, enabling companies to succeed by beating their competitors. Porter has explained the importance of differentiating an institution's products or services and creating and presenting them uniquely and acceptably across the industry (Kumera et al., 2024).

Differentiation strategies, which are realized through imitation capabilities, product durability, and ease of identification, are considered the core of institutional performance. They are regarded as weapons that enable companies to outperform their competitors. Companies that successfully implement differentiation strategies are more likely to build stronger customer loyalty and achieve sustainable competitive advantage in the market (Zhang & Zhang, 2022). Several researchers have found that, in the manufacturing sector, technological capabilities in products, processes, and services aim to reduce production costs, thereby improving overall institutional performance (Nanhong, 2023; Asghar et al., 2023). Furthermore, through investment in product and process research and development, companies can increase profitability (Khalifa, 2023). Although many studies confirm a positive correlation between these constructs, some studies show that innovation cannot directly affect business performance (Riswandari et al., 2023). The consistency in the correlation between these constructs is because successful innovation, differentiation, and service involve a combination of different types of capital, such as human and technological capabilities, limiting the correlation (Ismail, 2024; Zhang & Qi, 2023). Hence, several hypotheses are suggested as follows:

H5: Technological capabilities mediate the influence of product innovation on small metal firm marketing performance,

H6: Technological capabilities mediate the influence of differentiation on small metal firm marketing performance,

H7: Technological capabilities mediate the influence of service quality on small metal firm marketing performance.

METHODS

The research gathers information through a cross-sectional survey, which is a quantitative research method. An explanatory research groundwork is employed to clarify how predictor variables affect outcome variables. The study population is small-scale metal industry entrepreneurs in Tegal Regency. The sample is determined using a purposive sampling method, with the criterion that businesses have been operating for at least 3 years. A sample size of 150 small-scale metal industry entrepreneurs is obtained.

Data are gathered utilizing a five-point Likert scale, ranging from strongly disagree to strongly agree. The indicators employed for each variable are derived from prior research. The innovation indicators are adapted from previous research of Wijaya et al. (2025) and Probohudono et al. (2025). Service quality is aligned with SERVQUAL theory established by Parasuraman et al. (1988) and Tjiptono and Diana (2020). The differentiation embraces the indicators outlined by Islami et al. (2020). The marketing performance incorporates the indicators from Probohudono et al. (2025), while the technological capability indicator is based on the study by Valdez-Juárez and Castillo-Vergara (2021). Every research tool is tested for validity and reliability to ensure that the research uses appropriate instruments for data collection. The analysis of the data utilized to test the hypotheses involves Structural Equation Modeling (SEM) with SmartPLS.

The research employs a two-phase analytical framework comprising a measurement model and a structural model to evaluate the instrument's quality and examine the hypotheses. The measurement model also undergoes assessment through validity and reliability. In establishing construct validity, convergent validity is examined using outer loadings and Average Variance Extracted (AVE), and discriminant validity is confirmed through the Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) values. Reliability is determined using Cronbach's alpha and composite reliability indices. Evaluation of the structural model included the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), model fit index, hypothesis testing, and robustness analysis.

RESULTS AND DISCUSSION

Before conducting the research, the researchers test the instruments using Pearson's product-moment correlation and Cronbach's alpha to assess reliability. The validity and reliability of the instruments are tested on 30 respondents. It is found that all items used are valid and reliable, making them suitable for use as data collectors.

The researchers distribute the questionnaires to the respondents to test validity and reliability. A total of 150 small-scale metal industry entrepreneurs in Tegal Regency have participated in the research, with 80% male and 20% female. Most respondents are in the 30−40 age range (36.7%), followed by the 41−50 age group (26.7%). Regarding the length of business operation, the majority of respondents (40%) have been running their businesses for 6 to 10 years. Regarding monthly production volume, most respondents produce between 500 and 1,000 units per month (46.7%), implying that small-scale metal industries in Tegal operate on a medium production scale. Around 40% of businesses still use traditional marketing methods, while 33.3% switch to digital marketing, implying an opportunity to increase the level of technology use in marketing strategies. After analyzing the respondents' profiles, the first step is to assess the measurement model, which involves testing the validity and reliability of the constructs before proceeding to analyze the causal correlations between them.

Validity testing in Partial Least Squares-Structural Equation Modeling (PLS-SEM) analysis is conducted through two main approaches: convergent validity and discriminant validity. A construct is said to have good convergent validity if the AVE value is ≥ 0.5 (Hair & Alamer, 2022). In addition to the AVE value, convergent validity is supported by an analysis of the outer loadings. An indicator is considered to have adequate validity if its outer loading is≥ 0.7, indicating a high correlation (Hair & Alamer, 2022). The data presented in Table 1 (see Appendices) show that the outer-loading results from the convergent validity assessment indicate factor loadings exceeding 0.7. It indicates that each indicator maintains a strong correlation with the construct being evaluated. The AVE metric indicates that all constructs exceed the threshold of 0.5, thereby confirming that the criteria for convergent validity have been satisfactorily met (Hair & Alamer, 2022).

Discriminant validity is assessed using the Fornell-Larcker criterion, which requires the square root of the AVE for each construct exceeding its correlations with other constructs (Fornell & Larcker, 1981). As presented in Table 2 (see Appendices), the diagonal values, representing the square root of AVE are greater than the off-diagonal correlation values for all constructs. Specifically, differentiation (0.889), product innovation (0.880), marketing performance (0.893), service quality (0.793), and technological capability (0.809) all exceed their respective inter-construct correlations, confirming adequate discriminant validity. To further validate discriminant validity, the HTMT is examined. Following the threshold recommended by Henseler et al. (2015), all HTMT values should be below 0.90. As shown in Table 3 (see Appendices), all HTMT values remain below this threshold the highest being

0.891 (marketing performance). The results confirm that discriminant validity is satisfactorily established across all construct pairs (Sarstedt et al., 2020; Hair & Alamer, 2022).

The next structural model is assessed using several criteria, including R^2, f^2, Q^2, model fit index, and hypothesis testing. As shown in Figure 2, R^2 for marketing performance is 0.876. The model explains approximately 87.6% of the variance in marketing performance. This result provides evidence of substantial explanatory power (Hair & Alamer, 2022). The f^2 value shows that technological capability has a large effect on marketing performance ($f^2 = 0.376$), while differentiation has a moderate effect ($f^2 = 0.168$). Meanwhile, product innovation ($f^2 = 0.060$) and service quality ($f^2 = 0.017$) show small effect values on marketing performance. In the PLS-SEM approach, predictive accuracy is measured using the Q^2 value obtained through the blindfolding method. The marketing performance has a Q^2 value of 0.543, indicating that the model has strong predictive power for marketing performance (Hair & Alamer, 2022).

For model fit assessment, the Standardized Root Mean Square Residual (SRMR) value is 0.077, indicating an excellent fit as it falls below the recommended threshold of 0.08 (Hair & Alamer, 2022). Meanwhile, the Normed Fit Index (NFI) is 0.698, indicating an acceptable fit (Hair & Alamer, 2022). Collectively, these findings confirm that the model provides a satisfactory fit to the data. To examine the robustness of the estimated path coefficients, the research uses a 95% Confidence Interval (CI) with a critical value of 1.96.

Table 4 (see Appendices) delineates the outcomes of both direct and indirect hypothesis testing. The results show that product innovation has a positive effect on marketing performance, as evidenced by the parameters (β = 0.180; t-value = 2.466, p-value = 0.014). Hence, H1 is accepted. Furthermore, H2 shows that differentiation has a positive effect on marketing performance, as reflected in the values (β = 0.306; t-value = 3.427, p-value = 0.001). H2 is accepted. Conversely, H3 reveals several values (β = 0.096; t-value = 1.182, p-value = 0.238). High or low marketing performance is not significantly determined by service quality, leading to the rejection of H3. Furthermore, H4 presents several values (β = 0.423; t-value = 5.283, p-value = 0.000). Technological capability has a positive impact on marketing performance, so H4 is accepted.

In addition to examining direct effects, the research also explores indirect effects to determine whether technological capability mediates the influence of product innovation, differentiation, and service quality on marketing performance. Findings related to indirect effects indicate that H5 and H6 are supported, as evidenced by a significant value (β = 0.207; t-value = 3.652; p-value = 0.000) for product innovation. Technological capability mediates the effect of product innovation on marketing performance. Furthermore, the values (β = 0.147; t-value = 2.512; p-value = 0.012) for differentiation mean that technological capability mediates the effect of differentiation on marketing performance. Furthermore, the analysis results show that service quality has several values (β = 0.031; t-value = 0.715; p-value = 0.475), leading to

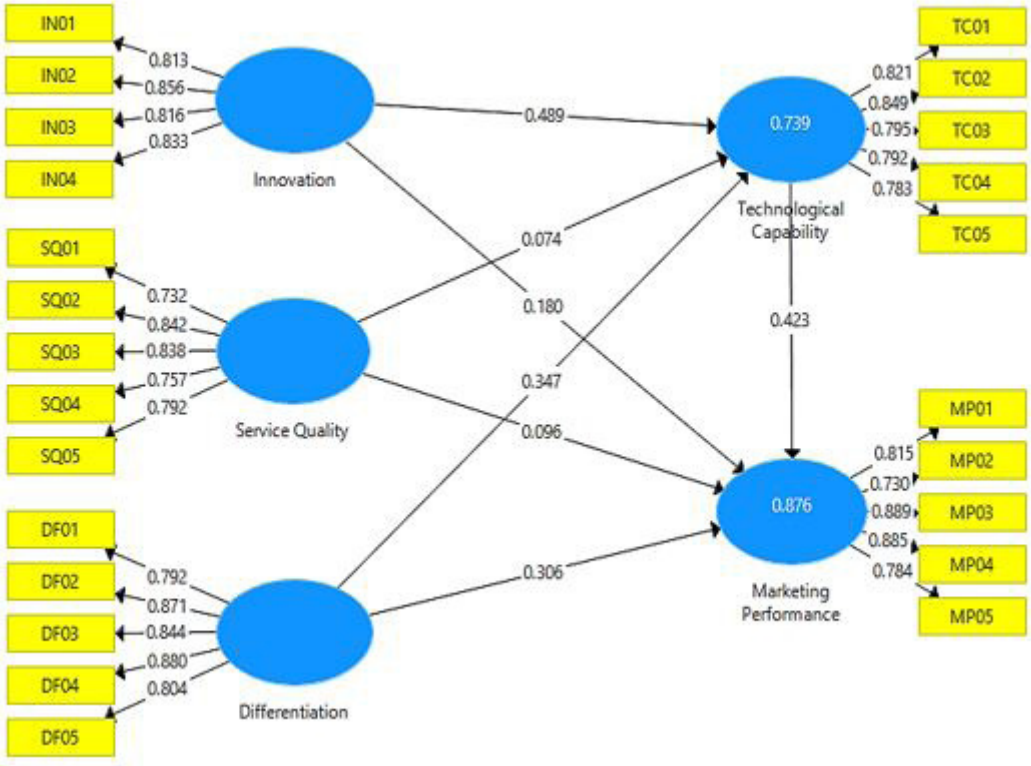


Figure 2 Measurement Model

the rejection of H7. Technological capability is unable to mediate the effect of service quality on marketing performance.

To assess the robustness of the structural model, the research employs a nonlinear assessment that includes quadratic effects. Linear models generally operate on the premise that modifications between concepts are direct and consistent. However, this basic idea often proves inaccurate when tested with real-world data. It means that linear methods can ignore nonlinear patterns, which compromise the accuracy of the results. It is important to conduct robustness checks for nonlinearity. It is important to test for potential nonlinearity to improve the robustness of empirical results. When nonlinear correlations are present, both the magnitude of the change and the predictor value must be considered when assessing the effect's relevance (Sarstedt et al., 2020). The research conducts robustness checks by including quadratic terms to identify possible curvilinear relationships in the structural model, following Hamidah et al. (2024). The analysis reveals that all quadratic paths are statistically insignificant, indicating that none of the hypothesized nonlinear effects are supported. These results reinforce the robustness of the proposed research model against potential nonlinear distortions.

The findings provide comprehensive insights into the strategic drivers of marketing performance in small metal companies. The analysis reveals that product innovation, differentiation, and technological capabilities have strong direct and indirect effects on marketing outcomes, whereas service quality does not. These results highlight the dominance of product-centered and capability-based mechanisms in shaping competitive performance in traditional manufacturing industries.

H1 states that innovation affects marketing performance. The results show that product innovation adoption correlates with improved marketing performance. The significant effect of product innovation on marketing performance indicates that companies that continuously improve product design, functionality, or precision achieve stronger market results (Tsai et al., 2022). In the metalworking sector, customers typically prioritize specifications, accuracy, and durability. Thus, gradual improvements in product quality directly strengthen buyer confidence, repeat orders, and market reputation. These findings reinforce the RBV perspective, which argues that unique product features constitute valuable, inimitable resources that contribute to sustainable performance excellence (Probohudono et al., 2025; Wati & Muis, 2025).

H2 states that innovation affects the marketing performance of small metal firms. The results show that successful differentiation can improve marketing performance. Small metal companies can offer customized fabrication, faster completion times, or unique workmanship benefits because this value proposition reduces direct price competition. From an RBV perspective, specialized skills and expertise act as scarce resources that are not easily imitated by competitors (Tjahjadi et al., 2023). It allows companies with a differentiation advantage to achieve greater visibility and stronger customer loyalty, especially when buyers emphasize specialized technical solutions (Febrianti, 2025; Dewangga & Layman, 2023).

H3 states that service quality affects the marketing performance of small metal firms. However, the results reject the hypothesis. It can be assumed that in the context of small metal firms, service quality does not always affect marketing performance because the characteristics of this sector emphasize product-oriented businesses rather than service oriented businesses. The metalworking industry is essentially product-driven, where customers evaluate suppliers based on machining precision, tolerance accuracy, material integrity, and production reliability rather than service interactions. As a result, service quality only serves as a complementary factor and does not directly shape marketing outcomes. This finding is consistent with previous research indicating that the influence of service quality on marketing performance is not always consistent or strong. In many SME contexts, service as an antecedent variable does not demonstrate a significant direct effect on business performance (Yahaya & Nadarajah, 2023). Similarly, the direct contribution of service quality to performance can be limited, particularly in industries where product attributes dominate purchasing decisions (Oluwasanmi et al., 2023). Even in the digital sector, although service quality influences customer satisfaction, its direct effect on marketing performance remains inconsistent (Uzir et al., 2020). Furthermore, service quality does not have a significant direct effect on marketing performance, reinforcing the notion that contextual factors particularly industry type play a decisive role in moderating this relationship (Rahadian et al., 2025).

H4 states that technological capabilities influence the marketing performance of small metal firms. The results show that technological capabilities play an important role in improving marketing performance (Heredia et al., 2022; Ciampi et al., 2021). The strong influence of technological capability on marketing performance reflects the extent to which small metal companies can utilize and adapt their production tools, machining equipment, and measuring instruments to meet customers' specifications. Technological capability does not refer to a high level of automation, but rather to the effective use of practical machining technologies commonly found in small workshops, such as conventional and semi- Computer Numerical Control lathes, milling machines, and precision grinding machines. The ability to reconfigure and optimize these simple technological assets aligns with Dynamic Capabilities Theory. The theory shows how small companies transform limited technological resources into superior marketing performance (Heredia et al., 2022).

H5 states that technological capabilities mediate the influence of innovation on the marketing performance of small metal firms. The results show

that innovations made by small metal firms, both in the form of new product development and the implementation of more efficient production processes, can optimally improve marketing performance due to the support of adequate technological capabilities. Technological capabilities enable small metal firms to integrate new knowledge, accelerate the adoption of innovative ideas, and translate them into products and services that meet market needs. This mediating aspect confirms that innovations not accompanied by technological capabilities often fail to provide significant added value to marketing competitiveness.

H6 states that technological capabilities mediate the effect of differentiation on the marketing performance of small metal firms. The results show that technological capability strengthens the ability of small metal firm to deliver unique products, improve quality, and expand market access through digital production and marketing technologies. Differentiation strategies, manifested through imitation capabilities, product durability, and ease of identification, are considered the core of institutional performance (Correia et al., 2021; Zhang & Zhang, 2022). They are also regarded as weapons that enable companies to outperform competitors driven by technological capabilities (Onufrey & Bergek, 2021).

H7 states that technological capabilities mediate the effect of service quality on the marketing performance of small metal firms. The results show that technological capability does not mediate the effect of service quality on marketing performance. This finding may reflect the industrial characteristics of small metal firms, where purchasing decisions are primarily driven by technical specifications, product durability, precision, and production reliability rather than service interactions. Previous studies have also suggested that in manufacturing-oriented industries, product-related capabilities tend to exert a stronger influence on performance outcomes than service-related factors (Kankam, 2023; Heredia et al., 2022). Although technological capability can improve internal efficiency and support product development, these capabilities may not be sufficient to strengthen the relationship between service quality and marketing performance in traditional manufacturing contexts.

CONCLUSION

The research is conducted to address a critical research question: how small metal companies operating with limited resources and facing increasing competitive pressures translate strategic orientations such as product innovation, differentiation, and service quality into marketing performance, and what role technological capabilities play in this process. Unlike broader SME classifications, the research specifically focuses on small metal companies. Their performance is shaped by craft-based production systems, dependence on technical skills, and small-scale industrial manufacturing characteristics.

The findings indicate that product innovation, differentiation, and technological capability are the main drivers of marketing performance in small metal companies. Product innovation and differentiation have a significant direct influence, reflecting the importance of customization and technical uniqueness in this industry. Technological capability also shows a strong direct influence and serves as the main mediating mechanism that enhances the effectiveness of product innovation and differentiation strategies. Conversely, service quality, although valuable in a relational context, does not significantly affect marketing performance in this product-dominated and specification-driven sector.

These results contribute to the theory by integrating RBV and DCT to explain how small manufacturing companies transform limited technological and strategic resources into competitive performance. The research highlights that technological capabilities in small metal companies are not defined by advanced automation, but rather by the practical ability to operate, adapt, and reconfigure conventional machining technology to meet diverse customer needs. These capabilities enable companies to strengthen the value of their innovation and differentiation strategies.

These findings offer important managerial implications for small metals firms. Business owners should prioritize product innovation and differentiation through incremental improvements in design, material quality, and customized product features, as these dimensions significantly enhance marketing performance. Technological capabilities play a crucial supporting role. Thus, even modest investments in semi-automatic machining tools, precision measuring instruments, or simple Computer Aided Design based design systems can significantly amplify the impact of innovation and differentiation. Because service quality does not directly impact marketing performance, business owners should selectively allocate resources to service improvements that complement technological and product enhancements rather than expanding service functions that do not enhance competitiveness.

From a policy perspective, strengthening the technological capabilities of small metals firms should be a priority for local governments and industry associations. Support programs can include subsidized access to machinery, incentives to adopt digital design tools, and structured training in applied manufacturing technologies. Because service quality does not significantly predict marketing performance, policy interventions should focus on improving production capabilities rather than service-oriented programs. These efforts collectively strengthen the competitiveness of traditional metals industries like Tegal.

Overall, the research advances contextual insight into performance drivers in small metal firms and provides empirical support for product-centered and capability-based strategies in traditional manufacturing settings. Nevertheless, the single-region dataset may constrain broader generalizability, suggesting the need for cross-regional, multi-sector, and longitudinal research to strengthen external validity and capture the dynamic development of technological capability. The weaker

effect of service quality likely reflects the industrial characteristics of these firms, in which purchasing decisions depend more on technical specifications, durability, and production reliability than on service interactions, reinforcing the central role of product-related capabilities in sustaining competitiveness.

Future research is encouraged to expand the research scope by incorporating cross-regional samples and broader manufacturing sectors to improve the generalizability of the findings. Longitudinal approaches may also provide deeper insights into how technological capability evolves and influences marketing performance over time. In addition, future studies can examine medium-sized manufacturing firms or compare different industrial clusters to identify contextual variations in strategic capability development. Further investigation into other organizational capabilities, such as digital integration or knowledge management capability, may also enrich the understanding of marketing performance in traditional manufacturing industries.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to Pancasakti University Tegal, Indonesia, and the Dean of the Faculty of Economics and Business for their academic and institutional support throughout this research. The authors are especially grateful to all respondents from the small-scale metal industry sector who generously shared their time, experience, and valuable information. The authors also extend their appreciation to all individuals and parties whose contributions helped facilitate the successful completion of this study.

AUTHOR CONTRIBUTIONS

Created a research draft, G.; Distributed questionnaires to respondents, G.; Recapitulated research data, G.; Conducted data analysis and processed with the Smart PLS application, D. P.; and Compiled research results and adjusted the article according to the Binus Business Review (BBR) Journal template, D. P.

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author, Deddy Prihadi, upon reasonable request. The data are not publicly available due to commercial confidentiality requirements involving the participating small metal industries.

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APPENDICES

Table 1 Results of Convergent Validity and Reliability

Variable/Item Code	Indicator	Outer Loading	Average Variance Extracted (AVE)	Cronbach's Alpha	Composite Reliability
IN			0.689	0.849	0.898
IN01	Products and services desired by customers	0.813			
IN02	Responding to customers' "new" demands	0.856			
IN03	Modifying offerings to meet client needs	0.816			
IN04	Planning new product development	0.833			
DF			0.704	0.894	0.922
DF01	Product differentiation	0.792			
DF02	Service differentiation	0.871			
DF03	Personnel differentiation	0.844			
DF04	Distribution differentiation	0.880			
DF05	Image differentiation	0.804			
SQ			0.630	0.852	0.894
SQ01	Completing orders on time	0.732			
SQ02	Understanding customer requests	0.842			
SQ03	Responsiveness to customers' needs	0.838			
SQ04	Responding to complaints	0.757			
SQ05	Utilizing modern equipment	0.792			
TC			0.654	0.867	0.904
TC01	Superior IT than competitors	0.821			
TC02	Technology for supplier negotiation	0.849			
TC03	Software for intra-departmental communication	0.795			
TC04	Qualified Information and Communication Technology (ICT) personnel	0.792			
TC05	ICT for decision-making	0.783			
MP			0.677	0.879	0.913
MP01	Maintaining profitability	0.815			
MP02	Consistent sales growth	0.730			
MP03	Meeting financial obligations (liquidity)	0.889			
MP04	Increasing customer numbers	0.885			
MP05	Strong customer loyalty	0.794			

Note: IN: Product Innovation, DF: Differentiation, SQ: Service Quality, TC: Technological Capability, and MP: Marketing Performance.

Source: Output of SmartPLS 4.0

Table 2 Results of Fornell-Larcker Criterion

Variable	Differentiation	Product Innovation	Marketing Performance	Service Quality	Technological Capability
Differentiation	0.889				
Product Innovation	0.798	0.880			
Marketing Performance	0.870	0.853	0.893		
Service Quality	0.849	0.819	0.828	0.793	
Technological Capability	0.800	0.827	0.891	0.769	0.809

Source: Output of SmartPLS 4.0

Table 3 Results of Heterotrait-Monotrait (HTMT)

Variable	Differentiation	Product Innovation	Marketing Performance	Service Quality	Technological Capability
Differentiation					
Product Innovation	0.815				
Marketing Performance	0.891	0.886			
Service Quality	0.867	0.862	0.854		
Technological Capability	0.806	0.858	0.817	0.889	

Source: Output of SmartPLS 4.0

Table 4 Results of Direct and Indirect Effects of the Variables

Hypothesis/Path	Direct Effect			Indirect Effect			Result
	β	T-Value	P-Value	β	T-Value	P-Value	
H1: IN → MP	0.180	2.466	0.014				Supported
H2: DF → MP	0.306	3.427	0.001				Supported
H3: SQ → MP	0.096	1.182	0.238				Rejected
H4: TC → MP	0.423	5.283	0.000				Supported
H5: IN → TC → MP				0.207	3.652	0.000	Supported
H6: DF → TC → MP				0.147	2.512	0.012	Supported
H7: SQ → TC → MP				0.031	0.715	0.475	Rejected

Note: IN: Product Innovation, DF: Differentiation, SQ: Service Quality, TC: Technological Capability, and MP: Marketing Performance.

Source: Output of SmartPLS 4.0