Optimizing Multi-Purpose Vehicle Efficiency for Competitive Advantage in Indonesia's Automotive Industry

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ABSTRACT

The Indonesian automotive industry, a key economic driver, faces intense competition, with Multi-Purpose Vehicle models dominating due to their suitability for large families and challenging road conditions. This study aims to evaluate the operational and marketing efficiency of seven Multi-Purpose Vehicle models from Brand T, marketed from January 2023 to June 2024, to strengthen market strategy. Using the Data Envelopment Analysis method with an input-oriented Charnes, Cooper, and Rhodes model, the analysis incorporated inputs like marketing, sales, trial unit, and training costs, and outputs including sales volume, market share, and gross profit. Findings reveal that five models achieved maximum efficiency (1.00), with the Multi-Purpose Vehicle segment averaging 0.90, outperforming sport utility vehicles, hatchbacks, and sedans. This efficiency stems from alignment with Indonesia's socio-economic needs, including price sensitivity and demand for durable, high-capacity vehicles. The study concludes that Brand T should prioritize resource allocation and innovation in Multi-Purpose Vehicles, repositioning less efficient models and using them as branding substitutes for halo cars. These strategies enhance profitability and competitiveness in Indonesia's price-sensitive market, reinforcing Multi-Purpose Vehicles as a strategic cornerstone.

***Keywords**: Automotive Industry, Data Envelopment, Efficiency, Marketing Strategy, MPV.*

ABSTRAK

Industri otomotif Indonesia, penggerak ekonomi utama, menghadapi persaingan ketat, dengan kendaraan Multi-Purpose Vehicle unggul karena cocok untuk keluarga besar dan kondisi jalan yang menantang. Penelitian ini bertujuan mengevaluasi efisiensi operasional dan pemasaran tujuh model Multi-Purpose Vehicle dari Merek T, yang dipasarkan dari Januari 2023 hingga Juni 2024, untuk memperkuat strategi pasar. Menggunakan metode Analisis Selubung Data dengan model Charnes, Cooper, dan Rhodes berorientasi input, analisis melibatkan input seperti biaya pemasaran, penjualan, unit uji coba, dan pelatihan, serta output berupa volume penjualan, pangsa pasar, dan laba kotor. Hasil menunjukkan lima model mencapai efisiensi maksimum (1,00), dengan segmen Multi-Purpose Vehicle rata-rata 0,90, melampaui kendaraan utilitas olahraga, hatchback, dan sedan. Efisiensi ini didorong oleh keselarasan dengan kebutuhan sosial-ekonomi Indonesia, termasuk sensitivitas harga dan permintaan akan kendaraan tahan lama berkapasitas besar. Kesimpulan penelitian menyarankan Merek T memprioritaskan alokasi sumber daya dan inovasi pada Multi-Purpose Vehicle, mereposisi model kurang efisien, dan menjadikannya pengganti mobil halo untuk branding. Strategi ini meningkatkan profitabilitas dan daya saing di pasar Indonesia yang sensitif terhadap harga, menegaskan Multi-Purpose Vehicle sebagai pilar strategis.

***Kata kunci**: Industri Otomotif, Penyelubungan Data, Efisiensi, Strategi Pemasaran, MPV.*

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INTRODUCTION

The Indonesian automotive industry significantly contributes to the national economy, impacting Gross Domestic Product (GDP), employment, and downstream industries. According to Indonesia.go.id (2024), the transportation equipment sector, including automotive, accounts for approximately 1.49% of Indonesia's GDP, equivalent to IDR 20.8 trillion, with a year-on-year growth rate of 7.63%, surpassing other processing sectors. This sector employs over 1.5 million workers across manufacturing, distribution, and after-sales services, underscoring its role in economic and social development (Amansyah et al., 2024; Mustajab, 2024). Amid rising competition, with over 35 vehicle brands and numerous model variants, manufacturers must prioritize cost-efficient and innovative products to maintain market competitiveness. The Multi-Purpose Vehicle (MPV) segment, known for its family-oriented design with high capacity and versatility, dominates the market, contributing 36.7% of national automotive sales and 59.4% of Brand T's total sales, as reported by the Indonesian Automotive Industry Association (*Gabungan Industri Kendaraan Bermotor Indonesia*/GAIKINDO) in 2024 (Guruminda & Widodo, 2023).

Consumer preferences for Multi-Purpose Vehicles in Indonesia are shaped by socio-economic and cultural factors, including large family structures, intercity travel needs, and a focus on value-for-money vehicles. These vehicles are perceived as durable, with high ground clearance suitable for Indonesia's challenging road conditions, such as flooding and potholes, making them a rational choice for price-sensitive middle-class consumers (Nasution, 2020). However, the diversification of Multi-Purpose Vehicle models increases operational complexity, necessitating efficient resource management in areas like marketing, sales training, and trial unit costs (Moraine et al., 2014; Weidner et al., 2019; Rashid et al., 2023). To address this, Data Envelopment Analysis (DEA), introduced by Charnes et al. (1978), offers a robust framework for evaluating the relative efficiency of decision-making units by comparing multiple inputs, such as marketing and sales costs, to outputs like sales volume, market share, and gross profit (Abdillah, 2022; Despotis et al., 2025). The ability of Data Envelopment Analysis to handle complex, multi-dimensional performance assessments makes it ideal for analyzing the efficiency of Multi-Purpose Vehicle models within Brand T's portfolio.

Despite extensive research on automotive industry efficiency, significant gaps remain in understanding segment-specific efficiency, particularly for Multi-Purpose Vehicles in Indonesia. According to Odlin (2019) and Huang (2021), most studies focus on firm-level efficiency across industries, often overlooking segment-level analyses that account for market-specific dynamics. Similarly, Nguyen and Nguyen (2019) and Neri et al. (2022) highlight that while Data Envelopment Analysis has been applied to automotive manufacturing, its use in evaluating model-specific marketing and operational efficiency in emerging markets like Indonesia is limited. These gaps indicate a need for targeted studies that assess how Multi-Purpose Vehicle models perform relative to other segments and how their efficiency can inform strategic portfolio management. Furthermore, prior research, such as that by Ghadge et al. (2022), emphasizes product modularity but does not fully explore how cultural and infrastructural factors, like Indonesia's family demographics and road conditions, influence segment efficiency. This study fills these gaps by examining the operational and marketing efficiency of seven Multi-Purpose Vehicle models from Brand T, using Data Envelopment Analysis to provide actionable insights for resource allocation and strategic positioning.

This research evaluates the strategic role of the Multi-Purpose Vehicle segment in enhancing Brand T's competitiveness in Indonesia's automotive market from January 2023 to June 2024. The study measures the relative efficiency of seven Multi-Purpose Vehicle models using the input-oriented Charnes, Cooper, and Rhodes Data Envelopment Analysis model, compares their efficiency against other segments like sport utility vehicles, sedans, and hatchbacks, and proposes data-driven strategies for optimizing resource allocation and portfolio management based on the results. By focusing on PT. XYZ, the official distributor of Brand T, the study leverages internal sales,

marketing, and financial data alongside reports from GAIKINDO to ensure robust analysis. The findings aim to deepen understanding of efficient product segmentation, offering practical implications for Brand T and other automotive players in Indonesia. By prioritizing Multi-Purpose Vehicles as a strategic axis, this research aligns with the need for data-driven decision-making in a competitive, price-sensitive market.

LITERATURE REVIEW

The Effect of the Automotive Industry in Indonesia

According to Amansyah et al. (2024), the automotive industry is a vital pillar of Indonesia's economy, significantly contributing to GDP, employment, and downstream industries. The transportation equipment sector, including automotive, accounts for 1.49% of Indonesia's GDP, approximately IDR 20.8 trillion, with a 7.63% annual growth rate, outpacing other manufacturing sectors (Kemenkeu, 2024; Indonesia.go.id, 2024). Employing over 1.5 million workers across manufacturing, distribution, and after-sales services, the industry drives economic progress and supports related sectors like spare parts, logistics, and maintenance services (Katsardis, 2024; Mustajab, 2024; Kabelitz-Bock et al., 2025). Its growth reflects rising consumer demand and vehicle ownership, signaling economic advancement and social mobility in Indonesia's emerging market, where urbanization and rising incomes fuel automotive consumption. The sector's ability to absorb labor and stimulate related industries underscores its strategic role in national development, particularly in supporting Indonesia's growing middle class and their mobility needs (Mardalena et al., 2019; Dartanto et al., 2020; Pratomo et al., 2020).

Xueliang (2013) and Lei and Xie (2024) highlight that the industry's influence extends to fostering innovation, infrastructure development, and regional economic growth. With over 35 competing brands, manufacturers must balance product diversity with cost efficiency to remain competitive in a crowded market (Guruminda & Widodo, 2023; Soedargo & Mulya, 2023; Noor & Mulayana, 2024). Government policies, such as tax incentives for local production and export promotion, enhance the sector's economic impact and encourage sustainable growth (Febrianto et al., 2024; Setiawan & Marlinda, 2024; Laksmi et al., 2025; Turyana & Suryatiningsih, 2025). The automotive industry shapes consumer behavior by offering vehicles tailored to local needs, particularly family-oriented models like MPVs, which align with Indonesia's cultural and demographic characteristics (Hartoyo et al., 2023). By driving technological advancements and supporting infrastructure like roads and service centers, the sector reinforces its role as a key economic driver across Indonesia's diverse regions.

Dominance of the Multi-Purpose Vehicle Segment

Guruminda and Widodo (2023) emphasize that the MPV segment dominates Indonesia's automotive market, contributing 36.7% of national sales and 59.4% of Brand T's total sales. MPVs are favored for their large capacity, accommodating Indonesia's prevalent extended family structures and supporting intercity travel needs across diverse regions (Nasution, 2020). Their high ground clearance suits Indonesia's challenging road conditions, such as flooding and potholes, making them more practical than sedans or hatchbacks (Bhatia & Kumar, 2022). Price sensitivity among middle-class consumers drives MPV popularity, as they offer value-for-money with low operational and maintenance costs, appealing to both urban and rural buyers. The segment's success reflects a deep alignment with Indonesia's socio-economic context, where affordability and functionality are critical purchase considerations.

The MPV's market strength is bolstered by strategic marketing, robust distribution networks, and consumer perceptions of reliability. Effective brand communication emphasizes MPVs' versatility and durability, resonating with consumers' practical needs for family and occasional commercial use (Song, 2021). Additionally, MPVs' ability to serve multiple purposes, from daily commuting to long-distance travel, broadens their market base, capturing diverse consumer segments (Ali & Anwar, 2021). Dealership networks and after-sales services further enhance consumer trust and loyalty, reinforcing

MPVs' dominance. This segment's success highlights a unique convergence of cultural, economic, and infrastructural factors, positioning MPVs as the preferred choice in Indonesia's automotive landscape and a critical focus for manufacturers aiming to maximize market share and profitability.

Operational Efficiency in the Automotive Industry

Noor-A-Rahim et al. (2022) stress that operational efficiency is essential for automotive firms managing diverse product portfolios in competitive markets. Efficiency involves optimizing inputs like marketing, sales training, and trial unit costs to maximize outputs such as sales volume, market share, and gross profit (Setiawan & Marlinda, 2024). Without efficient resource management, model diversification can lead to cost overruns, undermining competitiveness in price-sensitive markets like Indonesia (Lötscher-Stamm & Lenzin, 2024). Platform sharing and modular production reduce expenses by standardizing processes, particularly in high-performing MPV models, which benefit from streamlined manufacturing and distribution (Ghadge et al., 2022). Targeted marketing strategies, aligned with consumer preferences, further enhance profitability by ensuring resources are allocated effectively to high-demand segments, strengthening market positioning.

Operational efficiency also drives long-term competitiveness by aligning production with local market demands. Efficient cost management enables firms to offer competitive pricing while maintaining quality, a critical factor in Indonesia's price-conscious market, where consumers prioritize affordability and durability (Song, 2021). For Brand T, focusing on MPVs ensures sustainable operations amidst intense competition, as these models leverage economies of scale and consumer trust (Bhatia & Kumar, 2022). By optimizing supply chains and standardizing training programs, manufacturers can reduce operational costs while meeting diverse consumer needs. This approach not only enhances financial performance but also reinforces the automotive sector's role in supporting Indonesia's economic growth through efficient, market-aligned production strategies.

Data Envelopment Analysis in Efficiency Analysis

Abdillah (2022) highlights that DEA, developed by Charnes et al. (1978), is a robust tool for assessing relative efficiency across decision-making units (DMUs) in complex industries like automotive. Data Envelopment Analysis measures how effectively inputs like marketing, training, and trial unit costs are converted into outputs such as sales, market share, and profits, offering a non-parametric approach that accommodates multiple variables without assuming specific production functions (Despotis et al., 2025; Huang, 2021). Its flexibility makes it ideal for evaluating diverse vehicle models, identifying efficient units as benchmarks for improvement (Nguyen & Nguyen, 2019). In this study, DEA's application to Brand T's MPV models highlights their superior efficiency, guiding strategic resource allocation. By pinpointing inefficiencies, Data Envelopment Analysis provides actionable insights for optimizing marketing and operational strategies, enhancing overall performance.

DEA's practical value lies in its ability to support data-driven decision-making in heterogeneous markets. For automotive firms, Data Envelopment Analysis enables precise comparisons of model performance, helping prioritize high-efficiency segments like MPVs (Atina, 2023). By identifying underperforming models, firms can reallocate resources, refine marketing campaigns, or adjust production strategies to align with market demands (Mahboobi et al., 2020). In Indonesia's price-sensitive automotive market, DEA's insights are critical for balancing cost efficiency with consumer expectations for affordability and quality. This approach ensures that manufacturers like Brand T can optimize their portfolios, strengthen competitiveness, and achieve sustainable profitability by leveraging data to inform strategic planning and operational improvements.

Determinants of Efficiency in the MPV Segment

Ghadge et al. (2022) note that several factors drive efficiency in the automotive sector, with product modularity and platform sharing being critical for the MPV segment. These strategies reduce production costs by standardizing components across models, enabling economies of scale while maintaining quality and consumer appeal (Ali & Anwar, 2021). Rational pricing strategies, aligned with Indonesia's price-sensitive middle class, ensure MPVs remain affordable while offering features like spacious interiors and fuel efficiency that meet local needs (Song, 2021). Efficient distribution networks and after-sales support further enhance customer loyalty, reinforcing MPVs' market sustainability (Bhatia & Kumar, 2022). The combination of these factors such as modularity, pricing, and distribution creates a robust framework for MPV efficiency, aligning with Indonesia's cultural preference for large-capacity vehicles suited for family and intercity travel.

Effective marketing cost management is equally vital for MPV efficiency, as highlighted by Setiawan and Marlinda (2024). Targeted segmentation allows firms to focus resources on high-demand consumer groups, such as families and small businesses, maximizing sales and market share (Nasution, 2020). By leveraging consumer perceptions of MPVs as durable and versatile, manufacturers can optimize marketing campaigns to emphasize practical benefits like high ground clearance for Indonesia's challenging roads (Huang, 2021). These strategies ensure that MPVs not only meet market demands but also achieve high operational efficiency, making them a cornerstone of Brand T's portfolio. This alignment with local market dynamics and cost-effective operations positions MPVs as a sustainable and profitable segment in Indonesia's competitive automotive industry.

Benchmarking and Strategic Implications

Banker et al. (1984) assert that efficient units exhibit proportional input-output growth, known as Returns to Scale (RTS), providing a foundation for strategic planning in competitive industries. For Brand T, efficient MPV models serve as benchmarks to optimize underperforming models, leveraging their high performance to guide improvements (Jeong & Phillips, 2001). Platform sharing reduces production and training costs, enabling economies of scale in MPV manufacturing, which aligns with Indonesia's demand for affordable, family-oriented vehicles (Stefanoni & Voltes-Dorta, 2021). Prioritizing innovation, such as incorporating advanced safety or comfort features tailored to local needs, enhances MPVs' market fit and consumer appeal (Song, 2021). These strategies drive profitability by ensuring resources are allocated to high-impact segments.

Benchmarking efficient MPVs also informs long-term resource allocation and portfolio management. By focusing on high-performing segments, firms can streamline operations, reduce costs, and enhance marketing efficiency, critical in Indonesia's price-sensitive market (Setiawan & Marlinda, 2024). Integrating premium features into MPVs can replace less efficient halo cars, maintaining brand prestige while optimizing costs (Bhatia & Kumar, 2022). This approach strengthens consumer trust and loyalty through reliable, market-aligned products. By adopting standardized processes based on MPV platforms, manufacturers can achieve sustainable competitive advantages, ensuring long-term profitability and market leadership in Indonesia's dynamic automotive sector.

RESEARCH METHOD

This study employs a descriptive quantitative approach to evaluate the operational and marketing efficiency of MPV models from Brand T in Indonesia, utilizing Data Envelopment Analysis to assess relative efficiency across seven vehicle models marketed from January 2023 to June 2024. The Data Envelopment Analysis method, specifically the input-oriented Charnes, Cooper, and Rhodes model introduced by Charnes et al. (1978), was selected for its ability to handle multiple inputs and outputs without requiring specific statistical distribution assumptions, making it ideal for analyzing complex automotive performance data. This approach focuses on measuring how effectively resources are converted into desired outcomes, providing a robust framework for

comparing vehicle models. By focusing on the MPV segment, the study aims to identify efficient models and offer strategic insights for portfolio management, aligning with Indonesia's competitive automotive market dynamics.

The analysis centers on seven MPV models such as OF, CL, FROM, VL, VX, AND, and AL identified as DMUs based on sales data from PT. XYZ, the official distributor of Brand T in Indonesia. These models were chosen due to their prominence in the market, as reported by GAIKINDO. Data were sourced from PT. XYZ's internal reports, detailing marketing costs, sales expenses, trial unit costs, sales force training costs, sales volume, market share, and gross profit, supplemented by GAIKINDO's national automotive market reports and public financial data for 2023–2024. All financial data were normalized to ensure proportional comparisons across models, maintaining consistency in scale and measurement. This comprehensive data collection ensures a reliable foundation for evaluating efficiency across diverse operational and marketing dimensions.

The Data Envelopment Analysis analysis incorporates four input variables, namely marketing costs, sales costs, trial unit costs, and sales force training costs and three output variables, namely sales volume, market share, and gross profit to capture the multifaceted performance of each MPV model. The input-oriented Charnes, Cooper, and Rhodes model, which assumes constant returns to scale, focuses on minimizing inputs while maintaining output levels, aligning with the study's goal of identifying resource optimization opportunities. The analysis process involved constructing input-output matrices for the seven DMUs, applying a linear programming model via Microsoft Excel Solver to calculate efficiency scores, and identifying efficient (score = 1.00) and inefficient (score < 1.00) models. Efficient models lie on the efficiency frontier, optimizing resource use, while inefficient models indicate potential for improvement through benchmarking against high-performing units.

The results provide a clear framework for strategic decision-making, with efficient models serving as benchmarks for enhancing less efficient ones. Models scoring 1.00 demonstrate optimal resource utilization, while those below 1.00 highlight areas for operational or marketing adjustments, such as cost reallocation or strategy refinement. This methodology not only quantifies efficiency but also informs practical recommendations for Brand T to strengthen its MPV segment's competitiveness. By integrating robust data sources, a proven analytical tool like DEA, and a focus on market-relevant variables, the study ensures actionable insights for optimizing resource allocation and enhancing portfolio efficiency in Indonesia's dynamic automotive industry.

RESULTS

This study evaluates the operational and marketing efficiency of seven MPV models from Brand T in Indonesia such as OF, CL, FROM, VL, VX, AND, and AL using the input-oriented Charnes, Cooper, and Rhodes Data Envelopment Analysis model, which assumes constant returns to scale, over the period from January 2023 to June 2024. The analysis, conducted using Microsoft Excel Solver, assesses how effectively inputs, including marketing costs, sales costs, trial unit costs, and sales force training costs, are converted into outputs such as sales volume, market share, and gross profit, based on data from PT. XYZ's internal reports and GAIKINDO's national automotive statistics. Table 1, presented below, summarizes the efficiency scores for these seven MPV models, revealing that five models, namely OF, CL, FROM, VL, and VX achieved a perfect efficiency score of 1.00, indicating optimal resource utilization. In contrast, models AND and AL scored 0.57 and 0.86, respectively, highlighting inefficiencies in their operational and marketing strategies. These results, as shown in Table 1, underscore the MPV segment's robust performance, with 71% of models operating at maximum efficiency, positioning them as pivotal contributors to Brand T's profitability in Indonesia's competitive automotive market (Setiawan & Marlinda, 2024).

Table 1. MPV Model Efficiency Measurement Results

Model	Weighted Input	Weighted Output	Efficiency Score
OF	1.00	1.00	1.00
CL	1.00	1.00	1.00
FROM	0.97	0.97	1.00
VL	1.00	1.00	1.00
VX	0.10	0.10	1.00
AND	1.42	0.81	0.57
AL	0.44	0.38	0.86

The high efficiency of models OF, CL, FROM, VL, and VX, as depicted in Table 1, reflects their ability to maximize outputs relative to inputs, aligning closely with Indonesia's market demands for affordable, family-oriented vehicles that cater to large households and intercity travel needs (Nasution, 2020). These models effectively utilize marketing and operational resources, achieving high sales volumes and market share while maintaining strong profitability. For example, OF and CL benefit from targeted brand communication and extensive distribution networks, which resonate with Indonesia's price-sensitive middle class and cultural preference for spacious vehicles (Song, 2021). Conversely, the lower efficiency scores of AND (0.57) and AL (0.86) indicate inefficiencies, particularly in marketing and training costs relative to their outputs. Model AND's low score suggests a potential mismatch in market positioning, possibly due to targeting a niche segment or ineffective promotional strategies, while AL's moderate inefficiency points to opportunities for cost optimization or feature enhancements (Bhatia & Kumar, 2022). These findings, as illustrated in Table 1, provide actionable insights for Brand T to refine strategies for less efficient models by benchmarking against top performers, ensuring resources are aligned with market dynamics (Atina, 2023).

A comparative analysis across all 29 Brand T vehicle models, including SUVs, hatchbacks, sedans, halo cars, and commercial vehicles, was conducted to contextualize the MPV segment's performance, as presented in Table 2 below. Table 2 reveals that the MPV segment achieves the highest average efficiency score of 0.90, significantly outperforming SUVs (0.68), hatchbacks (0.66), sedans (0.38), halo cars (0.01), and commercial vehicles (0.66). This superior efficiency underscores the MPV segment's ability to convert marketing and operational investments into substantial sales and profits, driven by its alignment with Indonesia's cultural and infrastructural needs, such as large family structures and challenging road conditions like flooding and potholes (Guruminda & Widodo, 2023). The notably low efficiency of halo cars (0.01) highlights their limited market impact despite high marketing costs, suggesting a need to shift branding efforts toward more efficient segments like MPVs (Stefanoni & Voltes-Dorta, 2021). Table 2's results reinforce the MPV segment's role as Brand T's strategic cornerstone, offering a model for optimizing resource utilization across the entire portfolio.

Table 2. Efficiency Comparison with Other Segments

Model	Weighted Input	Weighted Output	Efficiency Score
MPV	0.90	1.00	0.90
SUV	0.68	1.00	0.68
Hatchback	0.66	1.00	0.66
Then	0.38	1.00	0.38
Halo Cars	0.01	0.41	0.01
Pick Up & Commercial	0.66	1.00	0.66

The MPV segment's average efficiency score of 0.90, as shown in Table 2, positions it as the most effective segment in Brand T's portfolio, reflecting its strong alignment with

consumer preferences for versatile, durable vehicles suited for Indonesia's unique market conditions (Ghadge et al., 2022). Models like OF and CL leverage modular designs and cost-effective production strategies, such as platform sharing, to achieve high sales and market share with controlled costs, making them exemplars of efficiency (Ali & Anwar, 2021). In contrast, the inefficiencies of AND and AL, as indicated in Table 1, suggest opportunities for strategic adjustments, such as refining marketing campaigns to target broader consumer segments or optimizing distribution channels to reduce costs (Huang, 2021). The significant gap between MPVs and other segments, as evidenced in Table 2, highlights the need for Brand T to prioritize MPVs in resource allocation and portfolio planning, capitalizing on their ability to deliver high returns in a price-sensitive market (Despotis et al., 2025). These findings provide a data-driven basis for enhancing operational strategies and strengthening Brand T's market position.

The results from Tables 1 and 2 offer critical insights for Brand T's strategic planning in Indonesia's automotive market. The high efficiency of five MPV models (OF, CL, FROM, VL, VX) indicates a robust operational and marketing framework that can serve as a benchmark for improving less efficient models like AND and AL. For instance, AND's low score of 0.57 may result from excessive marketing costs relative to its limited market reach, suggesting a need for more targeted campaigns or product repositioning to align with consumer expectations (Mahboobi et al., 2020). Similarly, AL's score of 0.86 points to moderate inefficiencies that could be addressed through cost restructuring or enhanced sales force training. The MPV segment's dominance, as shown in Table 2, underscores its strategic importance, encouraging Brand T to allocate resources toward MPVs to maximize profitability and market share. This aligns with the broader automotive industry's need to focus on segments that balance cost efficiency with consumer demand, particularly in Indonesia's price-sensitive market (Nguyen & Nguyen, 2019).

The superior performance of the MPV segment, as evidenced in Tables 1 and 2, positions it as a strategic asset for Brand T, offering a model for sustainable competitiveness in Indonesia's automotive landscape. The efficiency of models like VX, despite lower input weights, demonstrates that even resource-constrained models can achieve optimal performance through effective market alignment and cost management (Jeong & Phillips, 2001). In contrast, the low efficiency of segments like halo cars and sedans, as shown in Table 2, highlights their limited viability in a market that prioritizes practical, family-oriented vehicles. By focusing on MPVs, Brand T can streamline its portfolio, reduce operational costs, and enhance brand positioning through vehicles that address local needs, such as high ground clearance for flood-prone roads (Bhatia & Kumar, 2022). These results provide a compelling case for prioritizing MPVs in marketing and innovation strategies, ensuring Brand T maintains a competitive edge in Indonesia's dynamic automotive market.

DISCUSSION

The findings of this study confirm that the Multi-Purpose Vehicle (MPV) segment, with an average efficiency score of 0.90, outperforms other vehicle segments like SUVs, hatchbacks, sedans, and halo cars in operational and marketing efficiency, solidifying its role as Brand T's strategic cornerstone in Indonesia's automotive market. According to Guruminda and Widodo (2023), the MPV segment's dominance, contributing 36.7% of national sales and 59.4% of Brand T's sales, is driven by its alignment with Indonesia's socio-cultural and economic landscape. The segment caters to large family structures, a prevalent norm in Indonesia, where multigenerational households and collective travel for family events or intercity trips demand spacious, versatile vehicles. Models like OF and CL, achieving perfect Data Envelopment Analysis scores of 1.00, exemplify this by offering seven-seater configurations and fuel-efficient designs that resonate with price-sensitive middle-class consumers (Nasution, 2020). Their high ground clearance further enhances suitability for Indonesia's flood-prone and potholed roads, reinforcing consumer perceptions of MPVs as practical and durable (Bhatia & Kumar, 2022).

The efficiency of models OF, CL, FROM, VL, and VX reflects mature product and marketing strategies that optimize inputs like marketing costs and sales training to deliver high sales volumes and market share. Ali and Anwar (2021) note that rational pricing and feature alignment with consumer needs are critical for efficiency in price-sensitive markets. These models leverage modular production and platform sharing, reducing costs while maintaining quality, which allows Brand T to achieve economies of scale (Ghadge et al., 2022). In contrast, models AND and AL, with efficiency scores of 0.57 and 0.86, respectively, reveal inefficiencies due to high input costs relative to outputs. For instance, AND's low score suggests a narrow market focus or ineffective promotional strategies, while AL's moderate inefficiency indicates potential for cost optimization (Song, 2021). These models could benefit from benchmarking against efficient models like OF, adjusting features to better meet consumer expectations, or refining distribution channels to enhance market reach (Atina, 2023).

The MPV segment's superiority over other segments, such as sedans (0.38) and halo cars (0.01), highlights the limitations of diversification strategies that prioritize less efficient models. Setiawan and Marlinda (2024) argue that mass-market vehicles like MPVs, with broad appeal and cost-effective operations, outperform niche or premium segments in developing markets. The low efficiency of halo cars, despite high marketing investments, suggests they are less viable in Indonesia, where practical vehicles dominate consumer preferences. MPVs' ability to combine SUV-like durability with sedan-like affordability makes them a rational choice for consumers, supported by cultural beliefs in their versatility and economic value (Huang, 2021). This alignment with market dynamics positions MPVs as a strategic substitute for halo cars, enabling Brand T to maintain brand prestige without sacrificing efficiency (Stefanoni & Voltes-Dorta, 2021).

The implications of these findings are significant for Brand T's strategic planning. Prioritizing resource allocation to the MPV segment, particularly efficient models like OF and CL, can enhance profitability through targeted marketing and innovation in features like safety and comfort tailored to local needs. Inefficient models like AND and AL require repositioning, such as adjusting pricing or marketing to broader segments, to improve efficiency. Platform sharing should be expanded to reduce production costs across MPV models, while marketing campaigns should emphasize MPVs' suitability for Indonesia's road conditions and family-oriented culture. Additionally, Brand T can reorient its branding strategy by positioning premium MPVs as halo car substitutes, balancing cost efficiency with brand appeal. These strategies ensure sustainable competitiveness, aligning with Indonesia's price-sensitive market and reinforcing MPVs as the backbone of Brand T's portfolio.

CONCLUSION

This study utilized Data Envelopment Analysis to assess the operational and marketing efficiency of seven MPV models from Brand T in Indonesia, revealing that five models such as OF, CL, FROM, VL, and VX achieved maximum efficiency scores of 1.00, while AND and AL scored 0.57 and 0.86, respectively, indicating room for improvement. The MPV segment's average efficiency score of 0.90, the highest among segments like SUVs (0.68), hatchbacks (0.66), sedans (0.38), and halo cars (0.01), underscores its role as Brand T's most effective segment in converting inputs like marketing and training costs into outputs such as sales volume, market share, and gross profit. These findings highlight MPVs' strategic importance, driven by their alignment with Indonesia's large-family demographics and price-sensitive middle class, positioning them as a cornerstone for profitability and market dominance. Efficient models like OF and CL serve as benchmarks for optimizing Brand T's portfolio, reinforcing MPVs' position as a key driver of sustainable competitiveness in Indonesia's automotive industry.

The managerial implications of these results emphasize prioritizing resource allocation to the MPV segment, enhancing innovation in efficient models, and repositioning less efficient models like AND and AL through targeted marketing or cost optimization. However, the study is limited to Brand T and the 2023–2024 period, potentially

overlooking broader industry trends or long-term dynamics. Future research should include multiple brands to provide a comprehensive industry perspective and apply the Data Envelopment Analysis BCC model to capture variable returns to scale, addressing scale-related efficiency differences. Additionally, qualitative approaches, such as interviews with industry experts or consumers, could uncover strategic nuances behind model efficiency, complementing DEA's quantitative insights. These steps would enhance understanding of MPV efficiency and support data-driven portfolio strategies across Indonesia's automotive sector.

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