ANALYSIS OF THE INFLUENCE OF PRODUCT DESIGN AND PERCEIVED QUALITY ON CUSTOMER LOYALTY AMONG HYBRID CAR USERS: THE MEDIATING ROLE OF CUSTOMER SATISFACTION AND MODERATING ROLE OF PERCEIVED VALUE

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Abstract

The rise of global decarbonization has significantly transformed the automotive industry, with increasing demand for environmentally friendly vehicles. This study aims to analyze the influence of product design and perceived quality on customer loyalty among hybrid car users in DKI Jakarta, with customer satisfaction as a mediating variable and perceived value as a moderating variable. Integrating Expectancy-Value Theory as its theoretical foundation, this study employs a quantitative approach through an explanatory research design. Data were collected from 200 hybrid car users in DKI Jakarta and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings reveal that product design and perceived quality positively influence customer loyalty both directly and indirectly through customer satisfaction. Furthermore, perceived value strengthens the relationship between product design, perceived quality, customer satisfaction, and customer loyalty. This research provides theoretical and practical insights for automotive manufacturers to develop effective differentiation and customer retention strategies in an increasingly competitive market by emphasizing attractive product design, high-quality perceptions, and value propositions that enhance customer satisfaction and loyalty..

Keywords: Hybrid Vehicles, Product Design, Perceived Quality, Customer Satisfaction, Customer Loyalty, Perceived Value

INTRODUCTION

The global decarbonization era has driven significant transformation in the automotive industry. Recent data from the International Energy Agency (2023) indicate an 18% growth in global demand for eco-friendly vehicles in 2023. In Indonesia, Gaikindo (2023) reported a 35% increase in sales of environmentally friendly vehicles during the same period, compared to only 4.7% growth in the conventional automotive market. This phenomenon reflects a shift in consumer preferences toward greater environmental awareness and energy efficiency, as emphasized by Tian et al. (2022) in their longitudinal study on global energy consumption patterns. In an increasingly dynamic and competitive business environment, automotive companies strive to create products that are not only innovative in design but also deliver high experiential value to consumers, as noted by Mishra (2016). Razzaq et al. (2019) highlight that product design has become a focal point for both researchers and practitioners, while Moon et al. (2015) demonstrate that consumer purchase intentions have increasingly shifted from price-based considerations to design-driven ones.

Despite the growing momentum of the green automotive sector, Pinto et al. (2019) reveal that there remains a limited understanding of the factors influencing purchasing decisions and consumer loyalty within this segment. Bloch (2011) introduced the concept of three-dimensional product design—comprising functionality, aesthetics, and symbolism—as a framework for understanding how consumers perceive and interact with products. Homburg et al. (2015) empirically investigated this conceptualization and found that few studies have tested its impact on consumer behavioral outcomes. Sabir (2020) further supports the argument that differences in the evaluation of design dimensions can clarify which aspects most strongly influence consumer behavior, thus guiding managerial focus. Perceived quality has long been recognized as a key determinant of satisfaction and brand loyalty, as evidenced by Pan et al.'s (2021) meta-analysis. Nguyen & Park (2023) conclude that perceived quality is closely linked to brand trust and repurchase intention. Liu et al. (2022) identify that in the context of modern vehicles, perceived quality encompasses reliability, performance, and durability. Morgan & Rahman (2021) emphasize that consumers in Asian markets tend to evaluate quality based on long-term usage experience rather than technical specifications alone, highlighting the importance of cultural context in shaping consumer behavior. Zeithaml et al. (2020) argue that perceived value is a multidimensional construct gaining increasing attention in consumer behavior research. Oliveira & Santos (2023) define it as a holistic assessment of the benefits received relative to the sacrifices made. Taylor & Brown (2021) explain that in the context of eco-friendly vehicles, this value extends beyond economic benefits such as fuel savings to include social and environmental dimensions. Empirical findings from Kusumawati & Rahayu (2020) show that quality experience significantly affects perceived value, customer satisfaction, and loyalty, with satisfaction acting as a mediator between quality experience and loyalty.

Similarly, Hafidz & Huriyahnuryi (2023) confirm through empirical testing that perceived value plays a crucial role in fostering customer loyalty, particularly when service satisfaction aligns with fulfilled customer desires. Sabir's (2020) investigation involving 225 smartphone users revealed that product design acts as a dynamic trigger for customer experiential value, ultimately enhancing satisfaction. The study provided strong evidence that the influence of product design dimensions on customer satisfaction is mediated by affective responses, underscoring the importance of emotional aspects in consumer behavior. Ruiz-

Mafe et al. (2018) and Pappas et al. (2016) further emphasize that although researchers acknowledge the significance of relationships among emotional variables, information processing, and behavioral intentions, findings remain inconclusive regarding the interplay between emotion and cognition. Chikazhe et al. (2021), in a study involving 384 bank customers, examined how perceived service quality, customer satisfaction, and company image influence customer loyalty. They found that customer satisfaction and company image serve as important mediators in the relationship between service quality and loyalty. Hussein et al. (2018) similarly affirm the roles of experiential quality and perceived value in shaping customer loyalty. However, these studies do not fully integrate perceived value as a critical determinant of customer loyalty in high-involvement product categories such as automobiles. A meta-analysis by Watson et al. (2022) identifies two key gaps in current understandings of customer loyalty in the modern automotive industry. First, studies such as those by Liu et al. (2022) and Feng et al. (2024) generally assume that product design and perceived quality influence loyalty indirectly through satisfaction. However, empirical findings from Park & Kim (2023), based on a survey of 512 eco-vehicle consumers, suggest that impressive product design and high perceived quality can directly foster loyalty, even before full satisfaction is formed. Rivera & Chang (2022), through experimental research, further note that "contemporary consumers often form emotional bonds with brands based on perceived design and quality without necessarily going through a formal satisfaction evaluation phase."

Secondly, longitudinal studies by Wang et al. (2020) and Davis & Johnson (2022) with samples of 423 and 350 respondents respectively, underscore the importance of perceived value. Yet, according to Rahman et al. (2021), there remains a lack of comprehensive understanding of how this value influences relationships between other elements in consumer decision-making. Zhang & Li (2022) find that perceived value can alter the significance of relationships between product elements and loyalty across different market segments, though the pattern of change remains unclear. Zhao & Chen (2024), in an ethnographic study, add that the Indonesian market context is unique in that perceived value is heavily influenced by social and community factors, which may reshape the traditional linkages between product quality and brand loyalty. Given these phenomena and research gaps, there is a need to develop a more comprehensive understanding of how product design, perceived quality, and customer satisfaction influence brand loyalty in the context of modern vehicles, particularly by incorporating the mediating role of perceived value. As recommended by Chikazhe et al. (2021) and El-adly (2019), this study aims to analyze the direct and indirect effects of product design and perceived quality on customer loyalty, and to examine how perceived value moderates or mediates these relationships. Such insights will provide valuable strategic implications for automotive manufacturers seeking to differentiate their offerings and retain customers in an increasingly competitive market (Syah & Olivia, 2022; Slack et al., 2020).

REVIEW OF LITERATURE

The present study draws upon the Expectancy-Value Theory (EVT) as a foundational framework to explain consumer behavior in the context of hybrid vehicles. EVT, initially proposed by Zeithaml (1988), posits that consumers evaluate products or services based on the trade-off between perceived benefits and sacrifices, ultimately shaping their behavioral outcomes such as satisfaction and loyalty. In the automotive sector, particularly concerning

eco-friendly vehicles, this theory is highly relevant due to the complex decision-making processes consumers undergo when assessing product attributes like design, quality, and value (Zeithaml, 1988; Sweeney & Soutar, 2001).

Sweeney and Soutar (2001) further developed EVT and emphasized the central role of perceived value in influencing post-purchase consumer behavior, including customer satisfaction and loyalty. They argue that perceived value serves not only as an outcome of consumer evaluation but also as a moderating mechanism that shapes how other variables influence brand loyalty. This perspective has been supported by Kumar and Reinartz (2016), who found that perceived value acts as a key factor linking product attributes—such as design and quality—to customer loyalty. These findings suggest that perceived value should be considered as a moderating variable within the research model.

Empirical studies have confirmed the applicability of EVT in explaining the complex relationships among product design, perceived quality, customer satisfaction, and loyalty. Yang et al. (2022) demonstrated that perceived value significantly mediates the relationship between these constructs, especially in high-involvement purchase contexts like automobiles. Similarly, Chen et al. (2021) validated that in premium technology products, perceived value plays a pivotal role in determining the strength of the relationship between product quality, satisfaction, and brand loyalty. Based on these insights, the current study positions perceived value as a moderating construct that enhances the explanatory power of the model grounded in EVT.

Product design, defined by Homburg et al. (2015) as a multidimensional construct comprising aesthetics, functionality, and symbolism, has emerged as a critical driver of consumer perception and behavior. Rooted in Gestalt theory and informed by extensive literature reviews and consumer interviews, this conceptualization highlights how consumers organize visual and functional cues into holistic evaluations of a product. Luchs and Swan (2011) describe product design as a synthesis of form, function, and holistic properties, while Bloch (2011) identifies its utilitarian, hedonic, and semiotic dimensions. Aesthetic appeal, for instance, refers to sensory cues such as color, shape, and material that evoke emotional responses from consumers (Srinivasan et al., 2012). Functionality, on the other hand, pertains to the ability of a product to fulfill its intended purpose, reflecting performance and durability (Boztepe, 2007).

Perceived quality, another essential construct in consumer behavior, refers to the comparison between expected and actual product quality (Suttikun & Meeprom, 2021). According to Marshall and Johnston (2015), companies can influence this perception through consistent delivery of superior product features and service experiences. Perceived quality not only differentiates products in competitive markets but also justifies premium pricing strategies. Research by Loureiro et al. (2012) shows that high perceived quality increases the likelihood of customers choosing one brand over competitors. Assaker et al. (2020) confirm that perceived quality influences customer loyalty indirectly via satisfaction and trust. Moreover, Riyadi (2021) and Wahyuningsih & Sukaatmadja (2020) emphasize that perceived quality significantly contributes to building long-term brand loyalty. Vimla and Taneja (2021) add that perceived service quality mediates the relationship between brand image and patient loyalty, while Dam and Dam (2021) assert its significant impact on brand image, satisfaction, and loyalty.

Customer satisfaction, defined by Kotler and Keller (2013) as the consumer's evaluation of product or service performance relative to expectations, plays a crucial role in shaping loyalty. Companies strive to exceed customer expectations to foster long-term commitment (Marshal & Johnston, 2015). Minta (2018) argues that competitive advantage lies in a company's ability to surpass customer needs and deliver superior experiences compared to rivals. Vimla and Taneja (2021) note that satisfaction arises from how customers assess their experiences and outcomes. Dissatisfaction often leads to negative future outcomes and loss of trust in the service provider (Assaker et al., 2020). Numerous studies, including those by Dam and Dam (2021), Minta (2018), Cuong and Khoi (2019), and Özkan et al. (2019), confirm a strong positive relationship between customer satisfaction and loyalty.

Customer loyalty, as described by Marshall and Johnston (2015), reflects the ongoing value customers derive from their relationship with a brand. Kalia et al. (2021) define it as the intention to re-purchase specific products or services. Algesheimer et al. (n.d.) distinguish between behavioral loyalty (repeat purchases) and attitudinal loyalty (willingness to pay more for a preferred brand). Loyal customers are valuable assets who reduce marketing costs, enhance customer relationships, and increase profitability (Chinomona, 2016). Therefore, understanding the factors that drive loyalty—such as perceived value, quality, and satisfaction—is essential for firms seeking sustainable competitive advantage.

Perceived value, as defined by Kotler and Keller (2013), represents the total benefit consumers receive from a product or service relative to the cost incurred. Hanaysha (2018) emphasizes that perceived value reflects the extent of benefits obtained from a purchase, while Ruan et al. (2020) define it as a cognitive judgment of overall product excellence. Recent studies indicate that perceived value plays a critical role in shaping brand equity, customer satisfaction, and loyalty. Ruan et al. (2020) show that perceived value influences brand image, perceived quality, and brand loyalty. Suttikun and Meeprom (2021) find that perceived value mediates the relationship between perceived quality and word-of-mouth, an indicator of loyalty. Cuong and Khoi (2019) report a strong positive effect of perceived value on both satisfaction and loyalty. Özkan et al. (2019) demonstrate that perceived value partially mediates the relationship between customer satisfaction and loyalty. Hussein et al. (2018) reveal that perceived value also mediates the link between social interaction and customer loyalty, underscoring its multifaceted influence.

Several prior studies provide empirical support for the relationships among these constructs. Wang et al. (2020) show that perceived value directly and indirectly affects customer loyalty among hybrid vehicle owners, with satisfaction and brand image serving as mediators. Kusumawati and Rahayu (2020) find that experience quality influences loyalty through perceived value and satisfaction. Zhang et al. (2023) highlight the moderating role of perceived value in strengthening the link between satisfaction and loyalty, with product design identified as a key antecedent. Sabir (2020) confirms that affect mediates the relationship between symbolic and functional design dimensions and customer satisfaction. Liu et al. (2023) show that perceived quality influences loyalty directly and through satisfaction, moderated by brand trust. Park and Kim (2023) demonstrate that product design fosters loyalty through emotional attachment even before full satisfaction is formed. El-adly (2019) finds that perceived value positively affects satisfaction and loyalty, with satisfaction partially mediating the relationship. Hussein et al. (2018) show that perceived value mediates

the effect of experience quality on loyalty in boutique hotels. Nguyen and Park (2023) confirm the positive effects of perceived quality on brand trust and repurchase intention, moderated by brand awareness. Rivera and Chang (2022) show that emotional bonding to hybrid vehicles is shaped by design and quality perceptions, independent of satisfaction.

In conclusion, the theoretical foundation and empirical evidence reviewed above support the integration of product design, perceived quality, customer satisfaction, and perceived value in predicting customer loyalty. The moderating role of perceived value is particularly salient, aligning with the Expectancy-Value Theory and offering new insights into consumer behavior in the modern automotive industry, particularly in the Indonesian market context.

RESEARCH METHOD

This study adopts a quantitative research approach with an explanatory research design aimed at investigating the causal relationships between product design and perceived quality toward customer loyalty among hybrid car users. The conceptual model also examines the mediating role of customer satisfaction and the moderating influence of perceived value. Explanatory research is particularly appropriate for this study as it allows for hypothesis testing and clarification of underlying mechanisms influencing consumer behavior in the context of eco-friendly vehicles (Sekaran & Bougie, 2016; Zikmund et al., 2013). The research aligns with previous studies in the automotive sector that explore how multidimensional constructs such as design, quality, and value shape brand loyalty (Kumar & Ghodeswar, 2015; Zhang et al., 2023). Data collection was conducted using an online survey method through structured questionnaires distributed via various digital platforms including WhatsApp, Twitter (X), TikTok, and hybrid car user communities. This method was selected due to its efficiency in terms of time and cost, wide reach, and ease of data tabulation, which is essential for structural equation modeling using Partial Least Squares (PLS-SEM) (Saunders & Thornhill, 2019). The questionnaire was divided into four main sections: introduction, screening questions, demographic information, and measurement statements for the research variables—namely product design, perceived quality, customer satisfaction, customer loyalty, and perceived value. All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), ensuring interval-level data suitable for PLS-SEM analysis (Hair et al., 2022). The population of this study consisted of hybrid car owners and regular users residing in DKI Jakarta, Indonesia. A non-probability sampling technique, specifically purposive sampling, was employed to ensure that respondents met specific criteria relevant to the research objectives. A minimum sample size of 200 was targeted based on recommendations for PLS-SEM, which requires sufficient power to detect significant path coefficients while accommodating multiple predictor variables (Cohen, 1992; Hair et al., 2022). Prior to full-scale data collection, a pre-test was conducted with a small sample (n=30) to assess item clarity, internal consistency (using Cronbach's alpha), and content validity. Feedback from the pre-test was used to refine wording and structure before distributing the final version. Data analysis was performed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. This multivariate technique was chosen for its ability to simultaneously estimate measurement and structural models, making it ideal for examining complex relationships involving mediation and moderation (Hair et al., 2022; Sarstedt et al., 2022). The analytical

procedure followed a two-stage approach: first, assessing the measurement model to evaluate reliability and validity of constructs; second, analyzing the structural model to test hypotheses regarding direct, indirect, and moderated effects. Mediation effects were tested using bootstrapping with 5,000 resamples, while moderation effects were evaluated using the two-stage approach recommended for interaction terms in PLS-SEM (Becker et al., 2018; Sarstedt et al., 2022). Additional validation procedures included importance-performance map analysis (IPMA), multi-group analysis (MGA), and permutation tests to ensure robustness and generalizability of findings. To enhance the validity and reliability of the results, several procedural safeguards were implemented. These included verification questions within the questionnaire to identify inattentive respondents, initial screening to confirm ownership and usage of hybrid vehicles, and consistency checks across related items. Furthermore, content validity was ensured through expert review by academics and industry practitioners in the field of automotive marketing. These steps were taken to guarantee that the measurement instruments accurately captured the intended constructs in the context of hybrid vehicle users in Indonesia. Overall, the integration of explanatory research design, structured survey methodology, and advanced statistical techniques ensures that this study provides both theoretical and practical insights into the factors influencing customer loyalty in the emerging market for environmentally friendly vehicles in Indonesia.

RESULTS AND DISCUSSION

The results of this study provide empirical evidence regarding the influence of product design and perceived quality on customer loyalty among hybrid car users, with customer satisfaction acting as a mediator and perceived value as a moderator. The analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM), which allows for simultaneous evaluation of measurement and structural models, making it particularly suitable for examining complex relationships involving mediation and moderation (Hair et al., 2022; Sarstedt et al., 2022). A total of 270 responses were collected from hybrid vehicle owners in DKI Jakarta, Indonesia, and subjected to rigorous statistical testing to ensure validity and reliability.

Descriptive statistics revealed that respondents generally held positive perceptions toward hybrid vehicles. On average, respondents rated product design at 4.13 (on a 5-point scale), indicating a strong emphasis on aesthetics and functionality. Perceived quality had a mean score of 4.01, suggesting that consumers believe hybrid cars meet their expectations in terms of performance and durability. Customer satisfaction scored highest at 4.38, reflecting overall contentment with ownership experience. Customer loyalty recorded a mean of 3.98, showing moderate commitment to brand retention. Perceived value was also high at 4.05, implying that respondents feel the benefits derived from hybrid vehicles justify the cost incurred. These descriptive results align with previous studies that emphasize the importance of experiential and symbolic values in shaping consumer behavior (Zhang et al., 2023; Wang et al., 2020).

The measurement model was evaluated through convergent validity, discriminant validity, and internal consistency. Convergent validity was assessed using factor loadings and Average Variance Extracted (AVE). As shown in Table 4.7, all indicators exceeded the recommended threshold of 0.70 for factor loadings, indicating strong relationships between items and their respective constructs (Hair et al., 2022). AVE values ranged from 0.52 to 0.68

across constructs, surpassing the minimum threshold of 0.50, confirming adequate convergent validity (Fornell & Larcker, 1981).

Discriminant validity was tested using the Heterotrait-Monotrait Ratio (HTMT) criterion, which should be less than 0.90 (Henseler et al., 2015). All HTMT values were below this threshold, ranging from 0.63 to 0.89, confirming distinctiveness among latent variables. Cross-loadings and Fornell-Larcker criterion further supported discriminant validity by demonstrating that each item loaded more strongly on its intended construct than on others.

Internal consistency was evaluated using Cronbach's alpha and composite reliability (CR). Both metrics exceeded the recommended threshold of 0.70, with Cronbach's alpha ranging from 0.81 to 0.89 and CR from 0.85 to 0.92. These results indicate that the measurement instruments are both reliable and consistent in capturing the intended constructs (Nunnally, 1978).

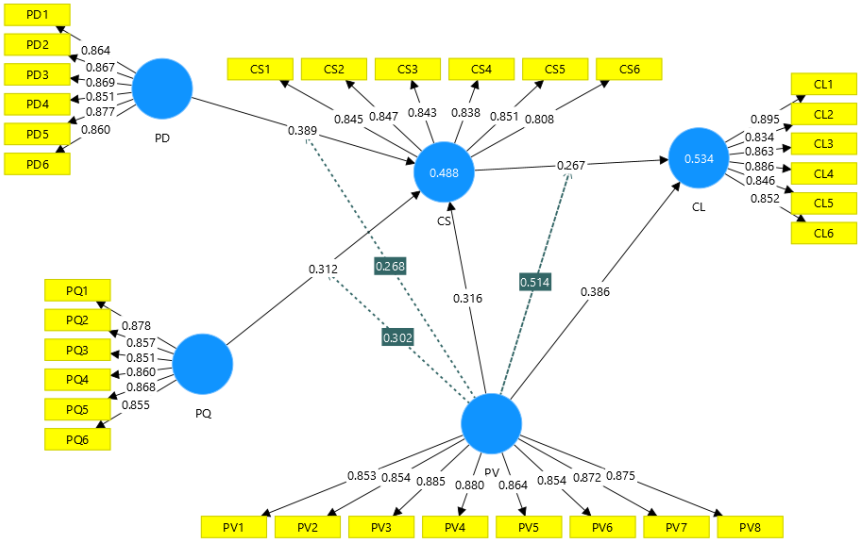

Figure 1
Structural Equation

The structural model was assessed through path coefficients, coefficient of determination (R^2), predictive relevance (Q^2), and effect size (f^2). Bootstrapping with 5,000 resamples was used to test the significance of direct, indirect, and moderated effects (Hair et al., 2022).

The structural model was tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the relationships between product design, perceived quality, customer satisfaction, customer loyalty, and perceived value. Hypotheses were tested based on t-statistics and p-values, with significance levels set at $\alpha = 0.05$.

Table 1
Hypothesis Testing

Hypothesis	Statement	Original Sample (O)	T statistics	P values	Conclusion
H1	Product Design → Customer Satisfaction	0.389	8.145	0.000	Accepted

H2	Perceived Quality → Customer Satisfaction	0.312	7.100	0.000	Accepted
H3	Customer Satisfaction → Customer Loyalty	0.267	5.205	0.000	Accepted
H4	Product Design → Customer Loyalty	0.386	7.239	0.000	Accepted
H5	Perceived Quality → Customer Loyalty	0.316	6.650	0.000	Accepted
H6	Perceived Value moderates the effect of Product Design → Customer Satisfaction	0.268	5.901	0.000	Accepted
H7	Perceived Value moderates the effect of Perceived Quality → Customer Satisfaction	0.302	7.098	0.000	Accepted
H8	Perceived Value moderates the effect of Customer Satisfaction → Customer Loyalty	0.514	10.917	0.000	Accepted

Source: Data Processed,2025

All hypotheses were supported, with significant positive relationships observed across all paths. The R^2 values for Customer Satisfaction and Customer Loyalty were 0.488 and 0.534 respectively, indicating medium-to-strong explanatory power. Effect sizes (f^2) ranged from 0.123 to 0.397, suggesting meaningful contributions of independent variables to the dependent variables.

Mediation analysis was conducted using bootstrapping with 5,000 resamples to test whether customer satisfaction mediates the relationship between product design and customer loyalty, as well as between perceived quality and customer loyalty. Results confirmed partial mediation effects, with indirect effects being statistically significant (product design → satisfaction → loyalty: $\beta = 0.104$, $p < 0.001$; perceived quality → satisfaction → loyalty: $\beta = 0.083$, $p < 0.001$). These findings support the Expectancy-Value Theory by highlighting the role of emotional and cognitive evaluations in shaping loyalty outcomes.

Moderation analysis revealed that perceived value significantly strengthens the relationships between product design and customer satisfaction ($\beta = 0.268$, $t = 5.901$, $p < 0.001$), perceived quality and customer satisfaction ($\beta = 0.302$, $t = 7.098$, $p < 0.001$), and customer satisfaction and customer loyalty ($\beta = 0.514$, $t = 10.917$, $p < 0.001$). Simple slope analysis indicated that higher levels of perceived value amplify these relationships, underscoring its moderating role in reinforcing the effectiveness of product attributes on behavioral outcomes.

The results demonstrate that both product design and perceived quality have significant direct effects on customer satisfaction and customer loyalty. This aligns with prior studies that emphasize the importance of aesthetic appeal and functional performance in shaping consumer perceptions (Bloch, 2011; Liu et al., 2022). In the context of hybrid vehicles, where consumers often prioritize environmental and technological features, attractive and innovative designs can create strong emotional bonds, while reliable performance enhances long-term commitment to the brand (Park & Kim, 2023).

Customer satisfaction emerged as a key mediator in the relationships between product design and customer loyalty, as well as between perceived quality and customer loyalty. This finding supports the Expectancy-Value Theory, which posits that consumers evaluate products based on the trade-off between benefits and sacrifices. When hybrid vehicles meet or exceed expectations in terms of design and quality, they foster positive emotional responses that translate into loyalty (Sabir, 2020). However, the presence of direct effects suggests that some consumers may form emotional attachments to brands without fully evaluating their satisfaction, particularly when perceived value is high.

Perceived value plays a crucial role in amplifying the effects of product design, perceived quality, and customer satisfaction on loyalty. This finding is consistent with Zhao & Chen (2024), who noted that social and community influences shape perceived value in emerging markets like Indonesia. For hybrid vehicle owners, perceived value extends beyond economic benefits to include environmental and social dimensions, making it a pivotal factor in reinforcing loyalty. Automakers should therefore focus not only on technical excellence but also on communicating the broader benefits of hybrid ownership, such as reduced carbon footprint and social prestige.

CONCLUSION

This study investigated the causal relationships between product design, perceived quality, customer satisfaction, and customer loyalty, with perceived value acting as a moderator among hybrid vehicle users in DKI Jakarta, Indonesia. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), all eight proposed hypotheses were supported, revealing significant positive effects across the research model. Product design and perceived quality were found to have both direct and indirect effects on customer loyalty through customer satisfaction. Furthermore, perceived value was confirmed to significantly moderate the relationships between product design and customer satisfaction, perceived quality and customer satisfaction, and customer satisfaction and customer loyalty. The findings contribute to both academic literature and industry practice. Theoretically, this study extends the Expectancy-Value Theory (EVT) by incorporating mediating and moderating mechanisms within the context of sustainable mobility. It provides empirical validation that consumer behavior toward hybrid vehicles is not only shaped by functional attributes but also by emotional and symbolic evaluations. These insights enrich the understanding of how multidimensional constructs such as product design and perceived quality influence behavioral outcomes, particularly in emerging markets like Indonesia. From a practical perspective, the results suggest that automotive manufacturers should prioritize innovative and aesthetically appealing designs, as these can directly enhance brand loyalty even before full satisfaction is formed. Moreover, maintaining high levels of perceived quality is essential for building trust and long-term commitment. Automakers are encouraged to communicate the broader economic, environmental, and social benefits of hybrid vehicles to strengthen perceived value, which in turn reinforces customer satisfaction and loyalty. Post-purchase service experiences also play a crucial role in sustaining positive consumer attitudes and encouraging repeat purchases or recommendations. Despite its contributions, this study has several limitations. First, the sample is limited to hybrid vehicle owners in DKI Jakarta, which may affect the generalizability of the findings to other regions or types of eco-friendly vehicles. Second, the cross-sectional nature of the data restricts the ability to infer causality

over time. Future research could address these limitations by conducting longitudinal studies across multiple geographic and cultural contexts. Additionally, exploring the influence of sociocultural factors, such as community engagement and peer influence, may provide deeper insights into consumer behavior in the green mobility sector.

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