

The Role of Product Warranty in Building Customer Loyalty: A Case Study of The Indonesian Tire Industry

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Abstract

This study explores the strategic role of product warranty in fostering customer loyalty within the Indonesian automotive tire industry. Drawing on signaling theory, the research investigates both the direct and mediated effects of product warranty on loyalty through brand trust, customer satisfaction, and brand image. A quantitative approach was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM), with data collected from 323 respondents who had purchased tires from major global brands. The results confirm that product warranty has significant positive effects on all three mediators, which in turn strongly influence customer loyalty. Mediation analysis reveals that customer satisfaction and brand image are the most influential pathways. These findings highlight that warranties function not only as functional assurances but also as symbolic signals that shape post-purchase evaluations and brand commitment. The study contributes to the marketing literature by extending signaling theory in the context of high-involvement purchases in emerging markets. It offers practical insights for companies to leverage warranty programs as strategic assets that enhance trust, satisfaction, and long-term loyalty.

Keywords: Product Warranty, Customer Loyalty, Brand Trust, Customer Satisfaction, Brand Image, Signaling Theory, PLS-SEM, Indonesia, Automotive Tires.

1. Introduction

The Indonesian automotive tire industry has become increasingly competitive, driven by market saturation and rising consumer expectations. In such a landscape, relying solely on product performance is no longer sufficient to ensure long-term customer retention. Firms are compelled to differentiate themselves through strategic post-purchase initiatives—one of the most prominent being the implementation of product warranties.

Product warranties serve a dual function: they provide legal assurance and simultaneously act as strategic marketing tools. According to signaling theory, warranties convey a company's confidence in its product quality, serving as a credible commitment to reliability and performance (Boulding & Kirmani, 1993; Liu & Yang, 2022). Empirical studies further support this perspective, demonstrating that warranties positively influence customer loyalty, particularly in high-risk industries such as batteries and healthcare products (Khan et al., 2023; Ogunleye & Adeyemi, 2024). Beyond manufacturing, warranties have been shown to strengthen customer retention in service-based sectors as well (Power & Odiri, 2023).

Despite the growing relevance of warranties in shaping consumer perceptions, previous studies have often examined their impact in isolation—such as linking warranty only to satisfaction or to trust—without analyzing the broader mechanism by which warranties build loyalty. This study addresses that gap by proposing a holistic model in which product warranty influences customer loyalty both directly and indirectly through three mediating constructs: brand trust, customer satisfaction, and brand image.

To empirically test this model, the study adopts a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM). Data were collected from 323 Indonesian consumers who recently purchased tires from leading global brands that offer formal warranty programs. This research not only extends signaling theory in the context of high-involvement purchases in emerging markets, but also provides actionable insights for firms seeking to position warranties as strategic assets in their customer retention and brand loyalty strategies.

2. Literature Review

Product Warranty

Product warranties have evolved beyond their original legal function to become strategic tools in marketing and consumer relationship management. They reduce perceived risk and reassure consumers post-purchase, particularly in high-involvement product categories such as automotive tires (Kotler & Keller, 2016). Khan et al. (2023) found that warranties significantly enhance customer loyalty by reinforcing the perceived reliability of products in high-risk industries. Similarly, Ogunleye and Adeyemi (2024) showed that warranty offerings contribute to customer retention in service contexts like healthcare. Supporting this, Power and Odiri (2023) highlighted that after-sales services—including warranties—are vital in encouraging repeat patronage, making them essential components in the loyalty-building process.

Brand Trust

Brand trust is defined as the customer's belief in a brand's reliability and integrity over time. Trust becomes especially relevant in the context of warranties, as it is often shaped by a firm's responsiveness and fairness in fulfilling warranty claims. Ambarwati et al. (2023) emphasized the mediating role of trust in the relationship between customer experience and loyalty. In addition, corporate social responsibility (CSR) initiatives contribute to consumer trust by signaling ethical commitment, which strengthens relational bonds (Ogunleye & Adeyemi, 2024). Javanshir and Kim (2024) further argue that consistent brand communication and alignment with sustainable values significantly enhance trust, especially in long-term customer relationships.

Customer Satisfaction

Customer satisfaction is a psychological outcome reflecting a consumer's evaluation of their post-purchase experience. It is widely accepted as a core determinant of loyalty. Geyskens and Dekimpe (2023), through a meta-analysis, confirmed the robust link between satisfaction and repeat behavior across industries. In the Indonesian automotive context, Nadarajah and Wah (2024) found that satisfaction derived from transparent and efficient warranty services directly influences loyalty. Moreover, service innovation—such as digitized warranty claims or proactive support—amplifies the customer experience and enhances satisfaction (Nguyen & Pham, 2024), thereby increasing the likelihood of brand advocacy.

Brand Image

Brand image encapsulates the perceptions and associations consumers have toward a brand, shaped by both direct interactions and marketing communication. Keller (2023) emphasizes that a favorable brand image strengthens customer-based brand equity and improves competitive positioning. Wu and Wang (2023)

demonstrated that CSR practices and high-quality service contribute positively to brand image, which in turn promotes loyalty. Additionally, Hsieh et al. (2022) showed that consumer evaluations of product, corporate, and even country-of-origin images significantly influence their purchase intentions and long-term brand attachment.

Customer Loyalty

Customer loyalty is a multidimensional construct encompassing both behavioral (repeat purchase) and attitudinal (emotional attachment) components. It is the culmination of trust, satisfaction, and a strong brand image. De Oliveira Santini et al. (2023) identified key drivers of loyalty such as responsiveness, trust, and service quality—attributes often shaped by warranty-related experiences. Kimura et al. (2024), in their 15-year review, found that satisfaction serves as a key mediator linking value perception to loyalty formation. Finally, Parvez and Alam (2023) offer a social resource theory perspective, suggesting that loyalty is sustained through reciprocal, mutually beneficial relationships between consumers and brands.

Conceptual Framework and Hypotheses Development

Based on the literature reviewed, this study proposes that product warranty influences customer loyalty both directly and indirectly through three key mediators: brand trust, customer satisfaction, and brand image. Each pathway is grounded in signaling theory and supported by empirical findings.

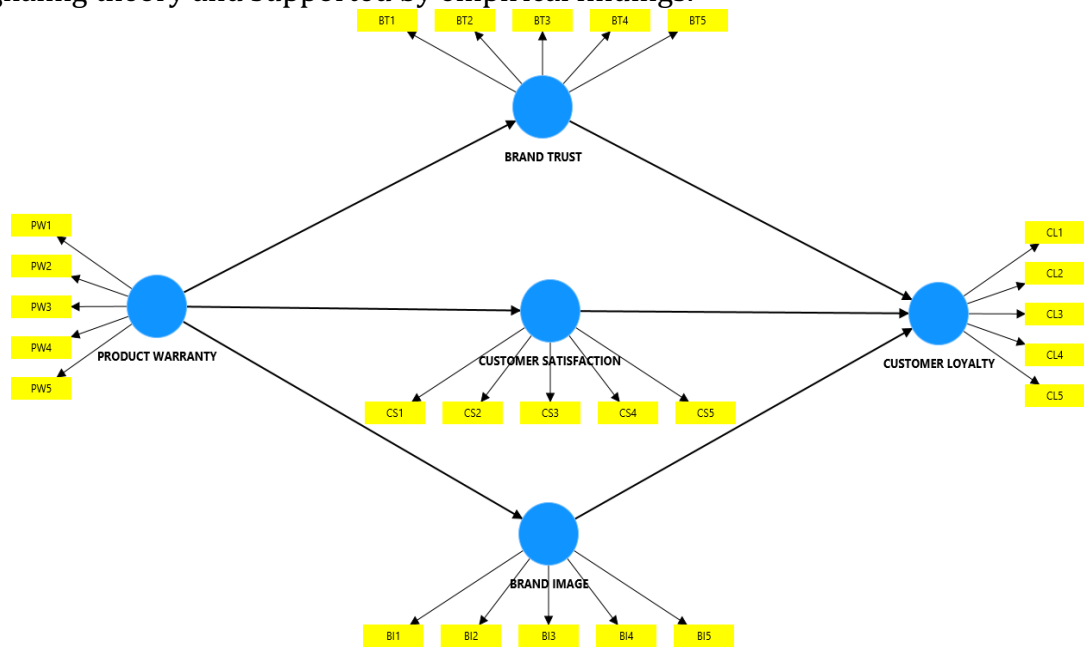


Figure 1

Source: Author’s own elaboration (2024)

The conceptual model is illustrated in Figure 1, and the proposed hypotheses are formulated as follows:

Direct Effects:

- H1: Product warranty has a positive effect on brand trust.
Supported by the notion that warranties signal reliability, fostering brand credibility (Khan et al., 2023; Javanshir & Kim, 2024).
- H2: Product warranty has a positive effect on customer satisfaction.

Efficient and transparent warranty processes increase satisfaction (Nguyen & Pham, 2024).

- H3: Product warranty has a positive effect on brand image. Warranties reinforce positive brand associations and consumer perceptions (Wu & Wang, 2023).

Mediated (Indirect) Effects:

- H4: Product warranty positively influences customer loyalty through brand trust. Trust acts as a psychological bridge between perceived reliability and behavioral loyalty (Ambarwati et al., 2023).
- H5: Product warranty positively influences customer loyalty through customer satisfaction. Satisfaction strengthens emotional and behavioral loyalty (Geyskens & Dekimpe, 2023; Nadarajah & Wah, 2024).
- H6: Product warranty positively influences customer loyalty through brand image. Brand image, shaped by post-purchase experiences, plays a key role in loyalty formation (Keller, 2023).

Control Pathways:

- H7: Brand trust has a positive effect on customer loyalty. Strong trust enhances the likelihood of customer retention (De Oliveira Santini et al., 2023).
- H8: Customer satisfaction has a positive effect on customer loyalty. Satisfied customers exhibit higher levels of repeat purchases and advocacy (Kimura et al., 2024).
- H9: Brand image has a positive effect on customer loyalty. A favorable brand image correlates strongly with consumer commitment and repurchase intentions (Hsieh et al., 2022).

This theoretical model builds upon existing loyalty frameworks by integrating cognitive (trust), affective (satisfaction), and perceptual (image) dimensions as mediators of the product warranty–loyalty relationship. It provides a comprehensive view of how post-purchase assurances can translate into long-term brand commitment.

3. Method

Research Design

This study employs a quantitative research approach to examine the influence of product warranty on customer loyalty, with brand trust, customer satisfaction, and brand image serving as mediating variables. Given the complexity of the proposed model and its predictive orientation, Partial Least Squares Structural Equation Modeling (PLS-SEM) is used as the primary analytical technique. PLS-SEM is suitable for models with multiple constructs, both reflective and formative, and is particularly robust for theory development in exploratory contexts (Hair et al., 2022).

Sampling and Data Collection

The target population includes Indonesian consumers who have purchased automotive tires from globally recognized brands offering formal product warranty programs, such as Bridgestone, Michelin, Goodyear, Dunlop, Continental, and Falken.

The study applied purposive sampling, using the following inclusion criteria:

- Consumers aged 21 years or older
- Have purchased tires from one of the selected brands within the last two years
- Are aware of the brand's warranty policy

Based on Slovin's formula at a 5% margin of error, the minimum sample size required was 385. Out of 400 distributed online questionnaires, 323 valid responses were retained after data cleaning, yielding a usable response rate of 80.75%.

Data collection was conducted via online distribution (WhatsApp, Instagram, Facebook), with screening questions implemented at the beginning of the questionnaire to ensure eligibility. Participation was voluntary and anonymous, adhering to ethical guidelines.

Measurement of Constructs

Each latent variable was measured using validated multi-item scales adopted from prior peer-reviewed studies. A 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) was used for all items.

Tabel 1.

Construct	Number of Items	Primary Sources
Product Warranty	5	Nugraha et al. (2024); Kriestian (2023)
Brand Trust	5	Arshad & Haroon (2023); Ambarwati et al. (2023)
Customer Satisfaction	5	Bianchi & Andrews (2020); Nadarajah & Wah (2024)
Brand Image	5	Wu & Wang (2023); Hsieh et al. (2022)
Customer Loyalty	5	Mittal et al. (2023); Kimura et al. (2024); Parvez & Alam (2023)

Source: Primary Data (2025)

A pilot test was conducted with 30 respondents to ensure clarity, contextual relevance, and linguistic appropriateness for the Indonesian audience. Minor adjustments were made to reflect local understanding.

Data Analysis Procedure

The analysis followed the two-step approach as recommended by Hair et al. (2022):

1. Measurement Model Evaluation

- Convergent validity was assessed via outer loadings and Average Variance Extracted (AVE).
- Internal consistency reliability was evaluated using Composite Reliability (CR) and Cronbach's Alpha.
- Discriminant validity was verified using the Fornell-Larcker criterion and cross-loadings.

2. Structural Model Evaluation

- Path coefficients were estimated and their significance tested via bootstrapping with 5,000 resamples.
- R-squared (R^2) values were used to assess the explanatory power of endogenous constructs.
- Model fit indices, including the Standardized Root Mean Square Residual (SRMR) and Goodness-of-Fit (GoF), were reported to determine overall model quality.

This methodological framework ensures both statistical robustness and practical interpretability of the relationships among product warranty, brand-related perceptions, and customer loyalty.

4. Result and Discussion

Respondent Profile

A total of 323 valid responses were analyzed. The majority of respondents were male (70%), aged 22–26 years (39.9%), held at least a bachelor's degree (62.5%), and reported a monthly income between IDR 5–10 million (50.2%). These demographics indicate a sample that is both experienced in automotive purchases and financially literate—making them relevant for evaluating high-involvement products like tires with formal warranty coverage.

Table 2. Respondent Demographic Profile

Criteria	Category	Frequency	Percentage (%)
Gender	Male	226	70,0%
	Female	97	30,0%
Age	17-21	81	25,1%
	22-26	129	39,9%
	27-30	65	20,1%
	>30	48	14,9%
Education	High School	97	30.0%
	Bachelor's	202	62.5%
	Degree		
	Master's/PhD	24	7.4%
Monthly Income (IDR)	<5 Million	65	20,1%
	5 – 10 Million	162	50,2%
	>10 Million	96	29,7%

Source: Primary Data (2025)

Measurement Model Evaluation

Convergent Validity and Reliability

All constructs surpassed the standard thresholds:

- AVE values > 0.50
- Composite Reliability and Cronbach's Alpha > 0.70

This confirms that the measurement items are both valid and internally consistent.

Table 3. Convergent Validity and Reliability

Construct	AVE	Composite Reliability	Cronbach's Alpha
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Product Warranty	0.666	0.909	0.909
Brand Trust	0.635	0.900	0.897
Customer Satisfaction	0.638	0.900	0.898
Brand Image	0.596	0.883	0.881
Customer Loyalty	0.600	0.884	0.883

Source: Primary Data (2025)

Structural Model Evaluation

The R^2 values indicate that the model explains a substantial portion of variance in the mediators and outcome variable.

Table 4. R-Squared Values

Endogenous Construct	R^2
Brand Trust	0.458
Customer Satisfaction	0.498
Brand Image	0.506
Customer Loyalty	0.707

Source: Primary Data (2025)

An R^2 of 0.707 for customer loyalty suggests the model has strong explanatory power.

Path Coefficients and Hypothesis Testing

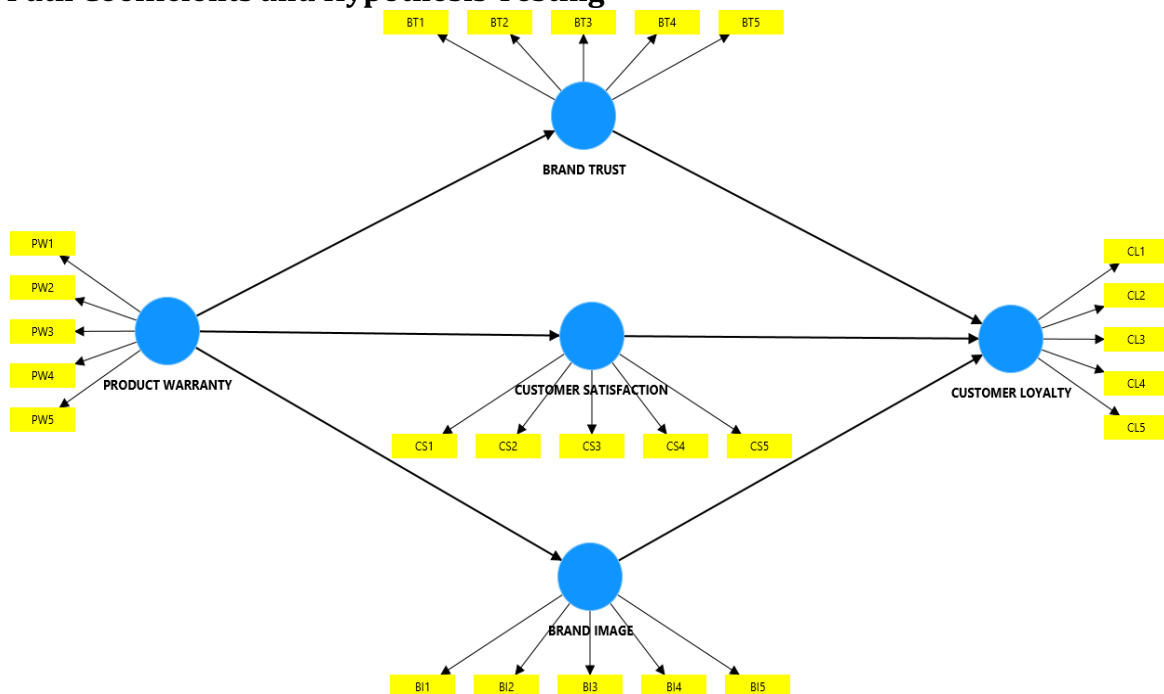


Figure 2.

Table 5. Direct Effects and Hypothesis Results

Hypothesis	Path	β	t-Stat	p-Value	Result
H1	Product Warranty → Brand Trust	0.677	15.702	0.000	Supported

H2	Product Warranty → Customer Satisfaction	0.706	14.699	0.000	Supported
H3	Product Warranty → Brand Image	0.711	16.837	0.000	Supported
H7	Brand Trust → Customer Loyalty	0.219	2.554	0.011	Supported
H8	Customer Satisfaction → Customer Loyalty	0.382	4.804	0.000	Supported
H9	Brand Image → Customer Loyalty	0.334	3.309	0.001	Supported

Source: Primary Data (2025)

Mediation Analysis

All indirect effects of product warranty on customer loyalty through the mediators are significant.

Table 6. Mediation Effects

Indirect Path	β	t-Stat	p-Value	Result
Product Warranty → Brand Trust → Loyalty	0.148	2.493	0.013	Supported
Product Warranty → Satisfaction → Loyalty	0.269	4.223	0.000	Supported
Product Warranty → Brand Image → Loyalty	0.238	3.160	0.002	Supported

Source: Primary Data (2025)

These findings support the multidimensional mechanism by which warranties affect loyalty—confirming that emotional (trust, image) and rational (satisfaction) constructs serve as essential bridges.

Model Fit

Table 7. Model Fit Indicators

Indicator	Value	Threshold	Interpretation
SRMR	0.041	< 0.08	Good Fit
GoF Min	0.456	>0.36 (Strong)	Acceptable
GoF Max	0.650	>0.36 (Strong)	Excellent Fit

Source: Primary Data (2025)

The model demonstrates excellent global fit, reinforcing its reliability for both theoretical and practical applications.

Discussion

These results highlight the strategic role of product warranty in customer loyalty formation. The strongest direct effects were observed on customer satisfaction and brand image, aligning with past findings that satisfaction mediates perceived value and repeat behavior (Kimura et al., 2024; Geyskens & Dekimpe, 2023). Furthermore,

trust—though slightly weaker in path strength—remains a key emotional lever, particularly when warranty fulfillment is timely and transparent (Ambarwati et al., 2023; Javanshir & Kim, 2024).

By demonstrating significant indirect effects through all three mediators, this study reinforces that warranties are not just operational tools, but strategic signals that shape post-purchase evaluation and customer-brand relationships across multiple dimensions.

5. Conclusion

Conclusion

This study investigated the role of product warranty in building customer loyalty within the Indonesian automotive tire industry. By incorporating brand trust, customer satisfaction, and brand image as mediating variables, the research provides a comprehensive understanding of the mechanisms through which warranties influence loyalty behavior.

All nine hypotheses were supported through empirical analysis using PLS-SEM on data collected from 323 Indonesian tire consumers. The results demonstrate that product warranty:

- Has a strong direct effect on brand trust, customer satisfaction, and brand image.
- Influences customer loyalty both directly and indirectly through the mediating constructs.

Among the three mediators, customer satisfaction and brand image showed the strongest pathways to loyalty, indicating that warranties function not only as performance guarantees but also as psychological and symbolic assets that shape customer perceptions and behavior.

Theoretical Implications

This study contributes to the literature in several ways:

- It expands signaling theory by empirically validating the multi-layered pathway from product signals to consumer loyalty, incorporating emotional and cognitive mediators.
- It addresses a gap in emerging market research by applying the framework to Indonesia's automotive industry, a high-involvement, high-risk product category.
- The integration of trust, satisfaction, and image offers a more holistic view of loyalty formation, reinforcing that loyalty is built on both affective commitment and rational evaluation.

Managerial Implications

For practitioners in competitive and commoditized markets:

- Warranties should be treated as strategic marketing tools, not merely legal necessities or cost centers.
- Firms must invest in communicating warranty terms clearly, ensuring that consumers perceive the policy as fair, accessible, and responsive.
- Post-sale service processes, such as efficient claim resolution and proactive customer support, should be optimized to strengthen satisfaction and trust.
- Marketing campaigns should position warranties as part of the brand's value promise, linking them to quality, care, and brand integrity.

By enhancing the symbolic and experiential value of warranty programs, companies can foster long-term emotional bonds and increase repeat patronage.

Limitations and Future Research

Despite its contributions, this study has several limitations:

- It focuses on a single industry and country context, which may limit the generalizability of the findings.
- The cross-sectional design restricts the ability to track long-term behavioral changes in loyalty.
- Data was self-reported, which may introduce bias in responses.

Future research should consider:

- Conducting longitudinal studies to assess how warranty perceptions and loyalty evolve over time.
- Extending the model to other sectors, such as electronics, healthcare, or service industries, to enhance generalizability.
- Exploring moderating variables such as customer personality traits, usage frequency, or prior brand experience to deepen theoretical insight.

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