

# Effects of Brand Image, Product Quality, Price, and Customer Satisfaction on SIM Card User Loyalty Among University Students

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## Abstract

**Purpose:** The Indonesian telecommunications market is intensely competitive, and student consumers represent a strategically important segment for SIM card operators. This study investigates the effects of brand image, product quality, price, and customer satisfaction on Telkomsel SIM card user loyalty among undergraduate students of the Faculty of Economics and Business, Universitas Labuhanbatu.

**Methodology:** A quantitative survey design was employed with a sample of 100 active Telkomsel SIM card users selected through convenience sampling. Primary data were collected using an online questionnaire with a five-point Likert scale. Classical assumption tests including normality, heteroscedasticity, and multicollinearity confirmed model eligibility.

**Results:** The regression equation  $Y = 2.459 + 0.267X_1 + 0.122X_2 + 0.355X_3 + 0.280X_4$  shows that brand image ( $t = 2.214, p = .029$ ), price ( $t = 4.295, p = .000$ ), and customer satisfaction ( $t = 4.063, p = .000$ ) each exerted a positive and significant effect on loyalty. Product quality was directionally positive but did not reach significance ( $p = .057$ ).

**Conclusions:** Price and customer satisfaction are the dominant individual drivers of Telkomsel SIM card loyalty in the student segment. Brand image also contributes significantly, while product quality approaches but does not cross the significance threshold.

**Limitations:** The convenience sample from a single university faculty, the cross-sectional design, and the absence of service quality as a predictor limit generalizability and model completeness.

**Contributions:** This study provides empirical evidence of the relative importance of four loyalty determinants in the student telecommunications market in North Sumatra.

**Keywords:** *Brand Image, Customer Loyalty, Customer Satisfaction, Price, Product Quality*

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## 1. Introduction

Indonesia's telecommunications sector is one of the most rapidly evolving and fiercely competitive markets in Southeast Asia. With smartphone penetration surpassing 70% of the national population

and mobile data consumption expanding at double-digit annual rates, SIM card operators must continuously sharpen their competitive positioning to attract new subscribers and retain existing ones ([Rahmawati et al., 2020](#); [Permatasari & Tjahjaningsih, 2022](#)). The competitive landscape features several major operators, including Telkomsel, Indosat Ooredoo Hutchison, XL Axiata, and Smartfren, each competing through network investment, pricing strategies, and brand communication. Among these, Telkomsel has historically maintained the largest subscriber base, supported by nationwide coverage, a well-established brand identity, and a diverse product portfolio ranging from conventional SIM cards to digital-first offerings such as By.U ([Suryanegara, 2023](#)). In volatile emerging markets like Indonesia, the ability to retain existing customers is widely regarded as more cost-efficient than continuously acquiring new ones, making loyalty a central strategic priority for telecommunications providers ([Giao et al., 2020](#); [Ali et al., 2021](#)).

University students represent a strategically critical consumer segment for SIM card operators. They are among the heaviest mobile data users, relying on stable and affordable connectivity for academic activities, social communication, and digital entertainment. At the same time, they operate within constrained household budgets, making them particularly attentive to the value-for-money proposition offered by telecommunications providers ([Saputri et al., 2021](#); [Ahmudin & Ranto, 2023](#)). Brand perceptions formed during university years are known to exhibit considerable durability, influencing telecommunications provider choices into professional life when purchasing power increases substantially. For Telkomsel, building loyalty in the student segment therefore has both immediate revenue significance and long-term strategic value ([Venessa & Arifin, 2017](#); [Siagian et al., 2021](#)).

Customer loyalty, broadly understood as the sustained disposition to repurchase or repatronise a preferred product or service, is recognised as the most important long-term outcome of marketing strategy, directly determining revenue sustainability, customer lifetime value, and competitive resilience ([Kotler & Keller, 2016](#); [Suwarsito & Aliya, 2020](#)). In the SIM card context, loyalty manifests as continued service use, resistance to switching, and willingness to recommend the operator to peers ([Wahyuning & Fadila, 2022](#); [Kusdibyo & Februadi, 2021](#)). Building these outcomes requires marketers to identify which marketing variables most powerfully drive loyalty in a given consumer segment.

The marketing literature has identified brand image, product quality, price, and customer satisfaction as the four most consistently documented loyalty determinants across telecommunications and consumer product markets ([Nababan & Alamanda, 2022](#); [Gultom et al., 2020](#)). Brand image shapes cognitive and affective associations that influence perceived reliability ([Kotler & Keller, 2009](#); [Iglesias et al., 2020](#)). Product quality determines whether the service fulfils its core functional promise ([Permatasari & Tjahjaningsih, 2022](#); [Riyadi & Prasetyo, 2022](#)). Price perceptions govern whether the value-for-money equation is perceived as favourable ([Ahmudin & Ranto, 2023](#); [Hidayat et al., 2022](#)). Customer satisfaction integrates cumulative experience into an affective evaluation that is the proximate antecedent of loyalty ([Kotler et al., 2000](#); [Sari & Sulistiono, 2023](#)).

Universitas Labuhanbatu, located in Rantauprapat, North Sumatra, serves a student population for whom Telkomsel is a primary operator choice, partly because of its strong network coverage in areas where competitor infrastructure remains limited. Preliminary observation among Faculty of Economics and Business (FEB) students revealed strong Telkomsel brand familiarity and high price sensitivity as dominant consumption considerations ([Nababan & Alamanda, 2022](#); [Lubis & Andayani, 2020](#)). While [Nababan and Alamanda \(2022\)](#), previously examined Telkomsel loyalty among Universitas Labuhanbatu management students, that study did not focus on the FEB population specifically, did not examine the relative magnitude of predictors through standardised coefficients, and did not explore the borderline product quality finding in depth. Research on student telecommunications loyalty in non-metropolitan North Sumatran markets also remains limited relative to the literature on Javanese and urban student populations ([Pramono & Wahyuni, 2023](#)).

The novelty of this study lies in its simultaneous examination of the relative effects of brand image, product quality, price, and customer satisfaction on Telkomsel loyalty in a specific non-metropolitan

student market, revealing the dominant role of price and satisfaction as well as the borderline insignificance of product quality in this context. This study fills a specific empirical gap in the Indonesian telecommunications marketing literature by providing granular, segment-specific loyalty evidence from a North Sumatran university student market.

## 2. Literature Review and Hypothesis/es Development

### 2.1 Customer Loyalty: Conceptual Foundation and Dimensions

Customer loyalty occupies a central position in contemporary marketing theory and practice. In its most widely adopted conceptualisation, loyalty refers to the customer's commitment to repurchase or repatronise a preferred product or service consistently in the future, maintained even in the presence of situational influences and competitor marketing efforts that might otherwise generate switching behaviour ([Kotler & Keller, 2016](#)). This definition encompasses both the behavioural dimension of actual repurchase behaviour and the attitudinal dimension of psychological commitment and positive affect toward the brand. The distinction matters in practice: behavioural loyalty may be sustained by switching barriers such as contract lock-ins or SIM card replacement friction, whereas attitudinal loyalty reflects authentic brand preference that is more durable and more likely to generate positive word-of-mouth referrals ([Suwarsito & Aliya, 2020](#); [Wahyuning & Fadila, 2022](#)). [Kusdibyo and Februadi \(2021\)](#) further argue that satisfaction serves as a critical bridge between quality perceptions and sustained attitudinal loyalty, a proposition that is especially relevant in telecommunications markets where functional performance differences between operators can be subtle.

In the SIM card market, loyal customers contribute lower acquisition costs, higher average revenue per user, greater resistance to competitor promotions, and organic subscriber growth through peer recommendations ([Kotler & Keller, 2016](#); [Ahmudin & Ranto, 2023](#)). For Telkomsel, maintaining loyalty among students is strategically valuable not only for current revenues but because students transitioning into professional life typically increase both data consumption and willingness to pay for premium services, making them high-lifetime-value customers when loyalty is established early ([Saputri et al., 2021](#); [Gultom et al., 2020](#)). [Rather et al. \(2021\)](#) found that customer engagement during formative consumption experiences significantly predicts long-term brand loyalty, suggesting that Telkomsel's student-facing engagement strategies carry loyalty dividends extending well beyond the university years.

The antecedents of telecommunications consumer loyalty have been extensively studied across diverse market contexts. In developing and emerging economy settings, [Giao et al. \(2020\)](#) demonstrated through structural equation modelling of Vietnamese mobile telecom users that service quality and price perception are the most direct loyalty drivers, with satisfaction mediating their effects. [Ali et al. \(2021\)](#) confirmed similar patterns in Pakistan, finding that service quality dimensions collectively explain a large proportion of loyalty variance in budget-conscious consumer segments. In the Indonesian context, the most consistently significant predictors remain brand image, product quality, price, and customer satisfaction, with varying rank orderings depending on the consumer segment and geographic market examined ([Nababan & Alamanda, 2022](#); [Winata, 2020](#); [Siagian et al., 2021](#)).

### 2.2 Brand Image and Its Effect on Customer Loyalty

Brand image is defined as the set of perceptions and beliefs that a consumer holds about a brand, reflected in the associations stored in memory and shaped by accumulated brand communication, product experience, and social influence ([Kotler & Keller, 2009](#)). A strong brand image reduces information search costs by allowing consumers to rely on brand associations as proxies for quality and reliability, provides an affective dimension to the consumption experience extending beyond functional product attributes, and signals social identity for consumers for whom brand choice is socially visible ([Rahmawati et al., 2020](#); [Iglesias et al., 2020](#)). [Iglesias et al. \(2020\)](#) further showed that when brand image is reinforced through consistent value-driven communication, it strengthens both customer identification with the brand and long-term loyalty commitments, a finding with particular relevance to Telkomsel's university campus marketing activities.

Empirical evidence from Indonesian telecommunications contexts consistently supports the positive brand image-loyalty relationship. [Nababan and Alamanda \(2022\)](#), confirmed significant brand image effects on Telkomsel loyalty among Labuhanbatu management students. [Venessa and Arifin \(2017\)](#) found that brand image significantly predicted purchase decisions among Universitas Brawijaya students. [Rahmawati et al. \(2020\)](#) documented brand image as a key predictor of Telkomsel customer satisfaction, which in turn drives loyalty. [Gultom et al. \(2020\)](#) confirmed through SEM that brand image influences loyalty both directly and through satisfaction in the North Sumatran telecommunications market.

[Agyei et al. \(2021\)](#), studying mobile telecommunications users in an emerging-economy context analogous to Indonesia, found that brand image and brand trust together exert a strong combined effect on loyalty, with brand image functioning as the more powerful of the two predictors when both are controlled simultaneously. [Lubis and Andayani \(2020\)](#) further confirmed, specifically in a North Sumatran consumer market, that brand image is a significant direct determinant of loyalty, supporting the applicability of  $H_2$  to the geographic context of the present study.

Telkomsel's brand equity, built over more than two decades as Indonesia's largest operator, encompasses associations with national coverage reliability, institutional partnerships, and an established reputation as Indonesia's trusted connectivity provider. For students in Rantauprapat, this brand equity translates into a perception of reliability that directly supports loyalty ([Winata, 2020](#); [Pramono & Wahyuni, 2023](#)). [Pramono and Wahyuni \(2023\)](#) found that Telkomsel's brand image remained the single most important predictor of customer loyalty among Telkom Indonesia users when controlling for service quality and price, underscoring the enduring strategic importance of brand investment even in the face of intensified price competition.

### **2.3 Product Quality and Customer Loyalty**

Product quality in the SIM card context is a multidimensional construct encompassing network coverage breadth, connection speed (3G, 4G, and 5G availability), call quality and clarity, data service reliability and consistency, diversity of available service packages, and accessibility of customer support channels ([Nababan & Alamanda, 2022](#); [Permatasari & Tjahjaningsih, 2022](#)). Quality represents the fundamental value premise of any telecommunications product: whether the service reliably delivers what it promises. When network quality meets or exceeds consumer expectations, it reinforces the loyalty rationale by providing no functional motivation for switching. Conversely, repeated quality failures constitute the most direct and compelling motivations for switching to a competitor operator ([Winata, 2020](#); [Saputri et al., 2021](#)). [Riyadi and Prasetyo \(2022\)](#) demonstrated that product quality directly influences brand trust, which in turn reinforces repurchase intention, suggesting that quality perceptions operate both directly and indirectly on loyalty through the brand equity pathway.

The relationship between product quality and loyalty in Indonesian SIM card markets is supported by multiple empirical studies. [Nababan and Alamanda \(2022\)](#) found product quality to be a significant loyalty driver among Labuhanbatu management students. [Winata \(2020\)](#) confirmed the strongest individual coefficient for product quality in a Telkomsel Simpati repurchase model. [Saputri et al. \(2021\)](#) documented significant product quality effects among Lampung student users.

[Pamungkas and Zuhroh \(2022\)](#) found that product quality significantly influences customer satisfaction, which then affects loyalty, implying that the quality-loyalty pathway may operate partly through satisfaction mediation rather than solely through a direct path. [Moriuchi and Takahashi \(2022\)](#) similarly found that quality perceptions and engagement together shape consumer satisfaction in digital services, a finding that is increasingly relevant as Telkomsel expands digital and application-based service offerings to its student user base. However, the theoretical literature also acknowledges the possibility of a quality adequacy threshold: in markets where all major operators have achieved comparable minimum standards, product quality ceases to be a differentiating loyalty driver ([Zeithaml, Bitner, & Gremler, 2020](#)). This quality adequacy hypothesis provides a theoretical basis for interpreting the borderline product quality result obtained in the present study.

#### **2.4 Price Perception and Customer Loyalty**

Price in the SIM card context encompasses both the objective pricing structure of data packages, call rates, and subscription fees, and the subjective dimension of perceived price fairness, which reflects whether the price paid is commensurate with the value and quality received ([Ahmudin & Ranto, 2023](#); [Kotler & Keller, 2016](#)). For student consumers, price sensitivity is structurally elevated by budget constraints: university students typically rely on parental allowances or limited part-time incomes, making mobile expenditure a recurring cost evaluated against academic materials, food, and transportation ([Saputri et al., 2021](#); [Suryanegara, 2023](#)). [Hidayat et al. \(2022\)](#) found that perceived price fairness significantly influences both satisfaction and loyalty among Indonesian student consumers of digital services, with an effect size that exceeds that of product quality when both variables are entered simultaneously into a regression model, a pattern that closely mirrors the present study's findings.

When students perceive Telkomsel's pricing as competitive, transparent, and value-aligned, favourable price perceptions reduce the economic rationale for switching to cheaper but potentially less reliable operators. Conversely, excessive pricing relative to competitor offerings becomes the primary switching catalyst ([Permatasari & Tjahjaningsih, 2022](#); [Chou et al., 2021](#)). [Chou et al. \(2021\)](#) specifically demonstrated in mobile service contexts that price fairness perceptions mediate the relationship between actual pricing levels and loyalty, meaning that how prices are communicated and framed matters as much as the absolute price level. [Hasan and Setiyaningrum \(2023\)](#) confirmed significant price effects on consumer loyalty in an Indonesian digital commerce context, supporting the generalisability of the price-loyalty relationship across different digital service sectors. The cumulative weight of this evidence establishes a strong theoretical and empirical basis for  $H_4$ .

#### **2.5 Customer Satisfaction and Customer Loyalty**

Customer satisfaction is conceptualized as the consumer's affective response to the disconfirmation between perceived product or service performance and prior expectations ([Kotler, Bowen, & Makens, 2000](#)). Positive disconfirmation generates satisfaction and its attendant loyalty-building effects, while negative disconfirmation increases switching propensity. In the SIM card context, the primary antecedents of satisfaction include network quality, service responsiveness, pricing fairness, and the overall consumption experience across all operator touchpoints ([Suryanegara, 2023](#); [Wahyuning & Fadila, 2022](#)). [Sari and Sulistiono \(2023\)](#) confirmed that satisfaction fully mediates the relationship between price perception and loyalty in an Indonesian telecommunications consumer context, suggesting that the mechanism through which price affects loyalty operates largely through the satisfaction pathway rather than through a direct cognitive switching calculus.

Customer satisfaction occupies a theoretically privileged position in the loyalty model as its proximate antecedent, integrating all loyalty-relevant attribute evaluations into a single summary affective judgment that directly motivates repurchase commitment ([Kotler & Keller, 2016](#); [Suwarsito & Aliya, 2020](#)). [Ahmudin and Ranto \(2023\)](#) identified satisfaction as the primary direct predictor of loyalty for Telkomsel users in Yogyakarta. [Rahmawati et al. \(2020\)](#) confirmed that satisfaction mediated the effects of brand image, product quality, and promotion on Telkomsel loyalty. [Gultom et al. \(2020\)](#) established through SEM that satisfaction is the dominant mediator in brand image-loyalty and service quality-loyalty pathways in North Sumatra. [Moriuchi and Takahashi \(2022\)](#)

[Moriuchi and Takahashi \(2022\)](#) found that satisfaction and customer engagement jointly influence loyalty in digital service platforms, with their combined effect exceeding the independent contribution of either variable. [Ananda et al. \(2020\)](#), in a cross-national study of telecommunications consumers, found that satisfaction is the strongest predictor of loyalty across all markets examined, regardless of whether the market is in a developed or developing economy context, lending strong cross-contextual validity to  $H_5$  in the present study.

#### **2.6 Hypotheses**

The study tests five hypotheses: ( $H_1$ ) whether the four variables jointly influence loyalty; and ( $H_2$ - $H_5$ ) whether each variable individually exerts a significant partial effect on loyalty. The findings provide

actionable guidance for Telkomsel's student segment marketing strategy in regional Indonesian markets ([Septiani et al., 2023](#); [Hasan & Setiyaningrum, 2023](#)).

$H_1$ : Brand image, product quality, price, and customer satisfaction secara simultan berpengaruh terhadap customer loyalty

$H_2$ : Brand image berpengaruh positif dan signifikan terhadap customer loyalty

$H_3$ : Product quality berpengaruh positif dan signifikan terhadap customer loyalty.

$H_4$ : Price berpengaruh positif dan signifikan terhadap customer loyalty.

$H_5$ : Customer satisfaction berpengaruh positif dan signifikan terhadap customer loyalty.

### 3. Research Methodology

#### 3.1 Research Design, Population, and Sample

This study adopts a quantitative survey design employing Multiple Linear Regression (MLR) as the primary analytical method. MLR is appropriate for simultaneously estimating the individual and joint contributions of multiple independent variables to a single continuous dependent variable, enabling both partial hypothesis testing through t-tests and simultaneous hypothesis testing through the F-test ([Ghozali, 2018](#); [Hair et al., 2019](#)). The quantitative approach is consistent with the positivist epistemological stance of the study, which seeks to test theoretically derived hypotheses about observable statistical relationships between marketing variables and loyalty in a specific consumer population ([Creswell & Creswell, 2018](#)). [Sugiyono \(2019\)](#) notes that quantitative survey designs are particularly appropriate when the research objective is to establish the direction and magnitude of relationships between constructs across a defined population, which is precisely the objective of the present study.

The study population comprised all Telkomsel SIM card users enrolled as undergraduate students in the Faculty of Economics and Business (FEB) at Universitas Labuhanbatu, Rantauprapat, North Sumatra, Indonesia. A sample of 100 respondents was selected through convenience sampling, which is appropriate for exploratory quantitative research targeting a population with a specific shared characteristic in an environment where a comprehensive sampling frame is unavailable [Sugiyono, 2019](#). All 100 respondents were verified as active Telkomsel users at the time of data collection. While convenience sampling limits generalizability, the use of a homogeneous target group sharing the same geographic telecommunications environment reduces unmeasured heterogeneity in network quality experience ([Hair et al., 2019](#)). [Ananda et al. \(2020\)](#) employed a comparable convenience sampling approach in their multi-country telecom loyalty study, noting that segment homogeneity partially offsets the generalizability constraints associated with non-probability sampling when the research aim is descriptive rather than inferential.

#### 3.2 Measurement, Data Collection, and Analysis Procedures

Primary data were collected using an online questionnaire distributed through social media channels accessible to FEB students. The instrument measured five constructs using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree): brand image ( $X_1$ ), product quality ( $X_2$ ), price ( $X_3$ ), customer satisfaction ( $X_4$ ), and customer loyalty ( $Y$ ). The construct indicators were adapted from validated instruments in prior Telkomsel loyalty research ([Nababan & Alamanda, 2022](#); [Ahmudin & Ranto, 2023](#)). Table 2 presents the operationalization of the five constructs, including their dimensions and illustrative indicators. The use of Likert-scale measurement for loyalty constructs is well established in telecommunications consumer research and has been validated across Indonesian and comparable developing-market contexts ([Siagian et al., 2021](#); [Giao et al., 2020](#)).

Table 2. Operational definition and measurement of research constructs

Variable	Dimension	Indicator	Scale
Brand Image ( $X_1$ )	Cognitive & Affective	Brand recognition, perceived reliability, market reputation, social trust	5-point Likert

Variable	Dimension	Indicator	Scale
Product Quality ( $X_2$ )	Functional Performance	Network coverage, data speed, call clarity, service diversity	5-point Likert
Price ( $X_3$ )	Price Perception	Price fairness, value for money, competitive pricing, affordability	5-point Likert
Customer Satisfaction ( $X_4$ )	Experiential	Performance vs. expectation, overall satisfaction, recommendation intent	5-point Likert
Customer Loyalty (Y)	Behavioral & Attitudinal	Repurchase intent, resistance to switching, positive WOM, commitment	5-point Likert

Table 2 show the three classical assumption tests were conducted to verify statistical properties required for valid MLR inference (Ghozali, 2018). First, normality of regression residuals was assessed through P-P Plot visual inspection. Second, heteroscedasticity was assessed through Scatterplot analysis of standardised residuals against standardised predicted values. Third, multicollinearity was assessed using VIF and tolerance statistics, with VIF values below 10 and tolerance values above 0.10 indicating acceptable inter-predictor independence (Ghozali, 2018; Hair et al., 2019). Partial effects ( $H_2$ - $H_5$ ) were tested using t-tests at alpha = .05; the simultaneous effect ( $H_1$ ) was tested using the F-test at alpha = .05. The regression model is:  $Y = a + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + \text{epsilon}$ , where Y is customer loyalty, B1-B4 are unstandardised regression coefficients, and epsilon is the error term. Pamungkas and Zuhroh (2022) and Hidayat et al. (2022) applied identical MLR specifications to loyalty models in Indonesian consumer markets, confirming the methodological appropriateness of this analytical approach for the present study's research objectives.

## 4. Results and Discussions

### 4.1 Classical Assumption Tests

Normality was assessed using the P-P Plot of standardised regression residuals. The plot confirmed that data points were distributed closely around the diagonal reference line without systematic deviation, satisfying the normality assumption. Heteroscedasticity was assessed using a Scatterplot of standardised residuals against standardised predicted values. The random distribution of data points without discernible clustering or funnelling confirmed the homoscedasticity assumption (Ghozali, 2018). These visual tests are consistent with the procedures adopted by Nababan and Alamanda (2022) and Puspitasari and Edris (2022) in comparable Indonesian consumer loyalty studies, lending comparability to the present study's assumption verification procedures. Multicollinearity was assessed using VIF and tolerance statistics.

Table 3. Multicollinearity test results: VIF and tolerance statistics (n = 100)

Variable	Tolerance	VIF	Decision
Brand Image ( $X_1$ )	0.518	1.929	No Multicollinearity
Product Quality ( $X_2$ )	0.534	1.843	No Multicollinearity
Price ( $X_3$ )	0.546	1.832	No Multicollinearity
Customer Satisfaction ( $X_4$ )	0.531	1.883	No Multicollinearity

Table 3 show all four independent variables yielded VIF values well below the threshold of 10, ranging from 1.832 to 1.929, and tolerance values well above the threshold of 0.10, ranging from 0.518 to 0.546. These results confirm the absence of harmful multicollinearity, establishing that regression coefficients can be interpreted as independent estimates of each variable's contribution to loyalty without distortion from inter-predictor correlation (Hair et al., 2019; Ghozali, 2018). The moderate VIF values (all under 2.0) indicate acceptable levels of inter-predictor overlap, consistent with patterns reported in comparable four-predictor MLR loyalty models in Indonesian consumer research (Hidayat et al., 2022; Siagian et al., 2021). All three classical assumption tests were satisfied, confirming the eligibility of the MLR model for hypothesis testing.

## 4.2 Multiple Linear Regression Results

The multiple linear regression analysis was performed with customer loyalty ( $Y$ ) as the dependent variable and brand image ( $X_1$ ), product quality ( $X_2$ ), price ( $X_3$ ), and customer satisfaction ( $X_4$ ) as predictors.

Table 4. Multiple linear regression coefficients: Effects on customer loyalty ( $Y$ )

Variable	B	Std. Error	Beta ( $\beta$ )	t-count	Sig.	Decision
(Constant)	2.459	1.352	-	1.819	.072	-
Brand Image ( $X_1$ )	0.267	0.121	0.179	2.214	.029	Significant
Product Quality ( $X_2$ )	0.122	0.063	0.152	1.927	.057	Not Significant
Price ( $X_3$ )	0.355	0.083	0.338	4.295	.000	Significant
Customer Satisfaction ( $X_4$ )	0.280	0.069	0.324	4.063	.000	Significant

Table 4 show the regression equation is  $Y = 2.459 + 0.267X_1 + 0.122X_2 + 0.355X_3 + 0.280X_4$ . The constant of 2.459 represents the theoretical baseline loyalty value when all predictors equal zero. All four unstandardised coefficients were positive, confirming directional consistency with theoretical predictions for all variables. Price ( $B = 0.355$ ,  $\beta = 0.338$ ) carried the largest standardised coefficient, followed by customer satisfaction ( $B = 0.280$ ,  $\beta = 0.324$ ), brand image ( $B = 0.267$ ,  $\beta = 0.179$ ), and product quality ( $B = 0.122$ ,  $\beta = 0.152$ ). This ordering is broadly consistent with the findings of [Hidayat et al. \(2022\)](#) and [Hasan and Setiyaningrum \(2023\)](#), who reported similar rank orderings of price and satisfaction as the dominant loyalty predictors in Indonesian student consumer contexts. The significance tests are interpreted for each hypothesis.

## 4.3 Discussion

### 4.3.1 Brand Image and Customer Loyalty (Hypothesis 2)

$H_2$  is supported to brand image exerts a positive and significant partial effect on loyalty ( $B = 0.267$ ,  $\beta = 0.179$ ,  $t = 2.214$ ,  $p = .029$ ). While brand image ranked third in standardised coefficient magnitude, its significance confirms that Telkomsel's accumulated brand equity contributes meaningfully to loyalty among FEB students beyond the effects of price and satisfaction. This finding is theoretically consistent with the brand image-loyalty literature ([Kotler & Keller, 2009](#); [Iglesias et al., 2020](#)). [Kotler and Keller \(2009\)](#) posit that brand associations stored in consumer memory function as cognitive and affective commitment mechanisms that sustain loyalty even when functional attributes are temporarily less favourable. [Iglesias et al. \(2020\)](#) extended this argument by demonstrating that brand image reinforcement through consistent communication significantly strengthens customer identification and long-term loyalty commitments.

The result replicates and extends the findings of [Nababan and Alamanda \(2022\)](#) and [Venessa and Arifin \(2017\)](#). For students in Rantauprapat, Telkomsel's brand image, built on decades of national advertising, institutional partnerships, and market leadership associations, functions as a trust anchor that supports loyalty even when service quality fluctuates. [Agyei et al. \(2021\)](#) found in a comparable emerging-market telecommunications context that brand image is the most powerful loyalty predictor when trust is controlled, confirming the robustness of this relationship across diverse developing-country settings. [Lubis and Andayani \(2020\)](#) further confirmed the brand image-loyalty relationship in a North Sumatran consumer market, directly supporting the present study's finding. The practical implication for Telkomsel is that campus brand engagement programmes, including student ambassador initiatives and social media activations, yield loyalty dividends beyond the immediate promotional period ([Rahmawati et al., 2020](#); [Septiani et al., 2023](#)).

### 4.3.2 Product Quality and Customer Loyalty (Hypothesis 3)

The hypothesis  $H_3$  is not supported: product quality does not reach statistical significance as a partial predictor of loyalty ( $B = 0.122$ ,  $\beta = 0.152$ ,  $t = 1.927$ ,  $p = .057$ ). The p-value is marginally above the .05 threshold, indicating a borderline result that might achieve significance with a larger sample or more sensitive instrument. The directional coefficient is positive, suggesting an absence of a perverse quality effect rather than the absence of any effect.

Two explanations are most plausible. The first is the quality threshold adequacy hypothesis: in the Rantauprapat market, where Telkomsel's network infrastructure historically provides stronger coverage than competitors, students may perceive SIM card product quality as a baseline attribute that meets minimum expectations across major operators rather than as a differentiating loyalty driver. When quality differences between operators are perceived as negligible, product quality ceases to discriminate between loyal and non-loyal consumers ([Saputri et al., 2021](#); [Zeithaml et al., 2020](#)). The second explanation concerns statistical power: with  $n = 100$ , detecting small effects while controlling for three other predictors is limited, and the quality effect's borderline p-value may reflect a genuine but modest contribution that requires a larger sample to detect reliably ([Hair, Black, Babin, & Anderson, 2019](#)). [Riyadi and Prasetyo \(2022\)](#), and [Pamungkas and Zuhroh \(2022\)](#) both found that product quality effects on loyalty become statistically clearer when the loyalty model also includes a satisfaction mediator, suggesting that the direct quality-loyalty path may be relatively weak whereas the quality-satisfaction-loyalty path is stronger. This mediation pathway may be suppressed in the present study's direct-effects-only specification.

#### 4.3.3 Price and Customer Loyalty (Hypothesis 4)

H4 is supported with the largest standardised coefficient: price exerts the strongest partial effect on loyalty ( $B = 0.355$ ,  $\beta = 0.338$ ,  $t = 4.295$ ,  $p = .000$ ). This unambiguously confirms that, among the four predictors, price is the most influential individual driver of Telkomsel loyalty among FEB students. The primacy of price is theoretically coherent: university students in North Sumatra operate under tight budget constraints, making mobile expenditure a significant recurring cost evaluated against competing necessities. Price sensitivity is therefore structurally elevated in this segment.

When students perceive Telkomsel's pricing as competitive and value-aligned, favourable price perceptions reduce the economic rationale for switching. When pricing is perceived as excessive, it becomes the primary switching catalyst ([Permatasari & Tjahjaningsih, 2022](#); [Chou et al., 2021](#)). [Chou et al. \(2021\)](#) demonstrated that price fairness perceptions mediate the relationship between actual pricing levels and loyalty in mobile service contexts, meaning that transparent value communication matters as much as the price level itself. [Hasan and Setiyaningrum \(2023\)](#) confirmed significant price effects on Indonesian digital consumer loyalty, and [Hidayat et al. \(2022\)](#) found that price fairness perception exerts a larger loyalty effect than product quality perception in Indonesian student consumer markets, a finding that precisely mirrors the present study's coefficient rankings. This finding replicates and reinforces the conclusions of [Saputri et al. \(2021\)](#) and [Ahmudin and Ranto \(2023\)](#). The practical implication is that competitive pricing and value-rich student-specific package designs should be Telkomsel's primary student retention investment.

#### 4.3.4 Customer Satisfaction and Customer Loyalty (Hypothesis 5)

H5 is supported: customer satisfaction exerts a positive and significant partial effect on loyalty ( $B = 0.280$ ,  $\beta = 0.324$ ,  $t = 4.063$ ,  $p = .000$ ). Satisfaction ranked second in standardised coefficient magnitude, closely behind price. The near parity between price ( $\beta = 0.338$ ) and satisfaction ( $\beta = 0.324$ ) coefficients suggests that both constructs make comparably large contributions to loyalty, with price having a marginally stronger independent effect when all four predictors are controlled simultaneously.

This result is consistent with the satisfaction-loyalty chain in the service marketing literature ([Kotler et al., 2000](#); [Kotler & Keller, 2016](#)). Satisfaction integrates cumulative evaluations of network quality, price fairness, brand trust, and service responsiveness into a holistic affective judgment that most directly motivates repurchase commitment. The significance of satisfaction as an independent predictor, even after controlling for product and price attributes, confirms that the satisfaction construct captures additional experiential variance from service encounter quality and complaint resolution effectiveness. [Sari and Sulistiono \(2023\)](#)

[Sari and Sulistiono \(2023\)](#) showed that satisfaction fully mediates the price-loyalty relationship in an Indonesian telecommunications context, suggesting that price influences loyalty largely through satisfying the consumer's value-for-money expectations. [Ananda et al. \(2020\)](#) confirmed across

multiple telecom markets that satisfaction is the strongest predictor of loyalty when other antecedents are controlled, lending cross-contextual validity to the present study's H5 finding. For Telkomsel's operational management, this underscores the critical importance of customer experience management, particularly complaint resolution quality and digital service touchpoint responsiveness, as a loyalty investment alongside pricing strategy ([Wahyuning & Fadila, 2022](#); [Kusdibyoy & Februadi, 2021](#)).

#### 4.4 Simultaneous F-Test (Hypothesis 1)

Table 5. ANOVA results: F-test for simultaneous effect on customer loyalty

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	180.840	4	45.210	50.321	.000
Residual	85.350	95	0.898	-	-
Total	266.190	99	-	-	-

Table 5 show the F-test yielded  $F = 50.321$ , significance value = .000, substantially below the  $\alpha = .05$  threshold. H1 is therefore supported: brand image, product quality, price, and customer satisfaction jointly and simultaneously exert a positive and significant effect on loyalty among FEB Universitas Labuhanbatu students. The large F-statistic reflects strong overall model fit. The regression model explained approximately 68% of loyalty variance (R-squared approximately .679), meaning the four predictors collectively capture the majority of relevant loyalty-determining variance in this consumer segment ([Ghozali, 2018](#); [Hair et al., 2019](#)). This explanatory power is comparable to that reported in multi-predictor loyalty studies in analogous Indonesian and Southeast Asian telecommunications contexts ([Giao et al., 2020](#); [Ali et al., 2021](#); [Siagian et al., 2021](#)).

#### 4.5 Hypothesis Testing Summary

Table 6. Summary of hypothesis testing results

H	Hypothesis	Coeff.	t / F	Sig.	Result
$H_1$	Brand image, product quality, price, and customer satisfaction jointly influence loyalty (simultaneous)	-	50.321	.000	Supported
$H_2$	Brand image positively and significantly influences loyalty (partial)	0.267	2.214	.029	Supported
$H_3$	Product quality positively and significantly influences loyalty (partial)	0.122	1.927	.057	Not Supported
$H_4$	Price positively and significantly influences loyalty (partial)	0.355	4.295	.000	Supported
$H_5$	Customer satisfaction positively and significantly influences loyalty (partial)	0.280	4.063	.000	Supported

Table 6 summarizes the hypothesis testing results on factors influencing customer loyalty. The findings show that brand image, price, and customer satisfaction have a positive and significant effect on loyalty, while product quality does not show a significant effect. Overall, the model indicates that the four variables jointly have a significant influence on customer loyalty.

## 5. Conclusions

### 5.1 Conclusion

This study examined the effects of brand image, product quality, price, and customer satisfaction on Telkomsel SIM card user loyalty among 100 undergraduate students of FEB Universitas Labuhanbatu using multiple linear regression. The regression equation  $Y = 2.459 + 0.267X_1 + 0.122X_2 + 0.355X_3 + 0.280X_4$  yielded four substantive conclusions. First, the simultaneous F-test confirmed that brand image, product quality, price, and customer satisfaction jointly and significantly predict loyalty ( $F = 50.321$ ,  $p = .000$ , R-squared approximately .679), validating the four-variable model as a meaningful framework for student telecommunications loyalty. The model collectively accounts for approximately 68% of loyalty variance, indicating that the four chosen predictors capture the majority of relevant loyalty-determining information available in this consumer context.

Second, brand image significantly and positively influenced loyalty ( $B = 0.267$ ,  $p = .029$ ), confirming that Telkomsel's established brand equity contributes to retention in the student segment. Third, product quality did not reach statistical significance as a partial predictor ( $B = 0.122$ ,  $p = .057$ ), a borderline result most plausibly attributable to the quality adequacy threshold in a market where Telkomsel's network quality meets basic student expectations without strongly differentiating from competitors.

Fourth, price was the dominant individual loyalty driver ( $B = 0.355$ ,  $\beta = 0.338$ ,  $p = .000$ ), confirming the primacy of price-value evaluation in budget-constrained student consumer decision-making. Fifth, customer satisfaction ranked second in standardised coefficient magnitude ( $\beta = 0.324$ ,  $p = .000$ ), confirming the robustness of the satisfaction-loyalty chain and the strategic importance of customer experience management alongside pricing strategy. The practical implications for Telkomsel are threefold: student-targeted pricing packages that communicate competitive value should be the primary retention investment; customer experience quality, especially at complaint and service touchpoints, should be consistently high; and campus brand engagement programmes should be maintained to sustain the brand image loyalty contribution.

### **5.2 Research Limitations**

This study has four limitations that should be considered when interpreting its findings. First, the convenience sample of 100 students from a single faculty at one university substantially limits generalisability to broader Telkomsel user populations, other geographic markets, and non-student consumer segments. The findings are descriptive of the FEB Universitas Labuhanbatu student market and cannot be extrapolated to Indonesian student markets more broadly without replication studies. Second, the normality and heteroscedasticity assumption tests relied on visual P-P Plot and Scatterplot inspection rather than formal statistical tests, reducing precision and reproducibility of assumption verification. Third, service quality, one of the most consistently documented antecedents of Telkomsel customer satisfaction and loyalty, was not included as an independent variable, potentially contributing to the unexplained loyalty variance (approximately 32%) and to the borderline product quality result. Fourth, the cross-sectional survey design prevents causal inference: the study establishes statistical associations but cannot establish temporal ordering or causal directionality of these relationships.

### **5.3 Directions and Future Study**

Future research should address the identified limitations through four avenues. A multisite replication study enrolling students from multiple universities across North Sumatra and other Indonesian regions would provide the statistical power needed to detect the borderline product quality effect reliably, enable geographic market comparisons, and support generalizability assessment across the diverse Indonesian student telecommunications market. The inclusion of service quality as a fifth predictor alongside brand image, product quality, price, and customer satisfaction would create a more complete loyalty model and enable testing of whether service quality mediates or moderates the product quality-loyalty and price-loyalty relationships. Mediation analysis using Structural Equation Modelling (SEM) or the PROCESS macro could test whether customer satisfaction fully or partially mediates the effects of brand image, product quality, and price on loyalty, clarifying the causal pathway from marketing mix perceptions to loyalty behaviour and providing more precise guidance for marketing strategy design.

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### **Author Contributions**

DB contributed to conceptualization, data collection, formal analysis, writing (original draft). NSH contributed to methodology, supervision, review and editing. CWN contributed to literature review, data validation, review and editing. All authors have read and agreed to the published version of the manuscript.

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