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The Effect of Delivery Duration and Drug Price on Consumer Satisfaction at Private Pharmaceutical Wholesale Distributor in Tangerang, Banten-Indonesia

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Abstract. Pharmaceutical wholesale distributors are critical intermediaries in Indonesia's healthcare supply chain. At PT Cipta Viriya Guna, delivery delays beyond the 24-hour service window and price-related complaints contributed to a 4% consumer and revenue decline in peak months of 2024. Despite this operational context, no prior study has simultaneously examined delivery duration and drug price as predictors of consumer satisfaction in a private PBF setting in Indonesia. Objective: To analyze the partial and simultaneous associations of delivery duration and drug price with consumer satisfaction at PT Cipta Viriya Guna, Tangerang, Banten. A quantitative cross-sectional survey was conducted with 193 institutional clients selected via systematic random sampling (April-May 2025). Validated Likert-scale instruments were used (Cronbach's alpha: 0.917, 0.860, 0.910). Multiple linear regression with classical assumption testing was applied. Delivery duration was significantly and negatively associated with consumer satisfaction (beta = -0.389, t = -6.262, p = 0.000); drug price was significantly and positively associated with satisfaction (beta = 0.507, t = 8.166, p = 0.000). Simultaneously, both variables explained 31.2% of satisfaction variance (F = 43.015, p = 0.000; R = 0.558; Adjusted R2 = 0.305). Delivery duration and drug price are significant predictors of consumer satisfaction in pharmaceutical wholesale distribution.

Keywords: Delivery Duration, Drug Price, Consumer Satisfaction, Pharmaceutical Distributor, Supply Chain

1 Introduction

The pharmaceutical distribution sector in Indonesia functions as a critical intermediary between drug manufacturers and healthcare facilities. *Pedagang Besar Farmasi* (PBF), formally defined under Permenkes No. 6 of 2011 and its amendments, are legally authorized entities responsible for wholesale procurement, storage, and distribution of pharmaceutical products to licensed healthcare facilities including pharmacies, clinics, hospitals, and health centers [1], [2].

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Operational performance in pharmaceutical wholesale distribution is particularly sensitive to logistical variables. Delivery duration, defined as the time elapsed from order placement to product receipt by the client, directly influences drug availability at the point of care. In emergency situations (cito orders), any delay beyond the expected 24-hour delivery window can compromise patient safety and disrupt clinical operations. Pharmaceutical logistics researchers have consistently demonstrated that delivery reliability is a primary determinant of customer satisfaction in healthcare supply chains [3]–[5].

Price perception is equally significant in pharmaceutical distribution. Drug prices in Indonesia are subject to upward pressure from the country's heavy reliance on imported active pharmaceutical ingredients, constituting approximately 88% of raw material sourcing. Price fluctuations driven by exchange rate volatility and supply disruptions frequently affect PBF pricing strategies [6]. For institutional buyers such as pharmacies and clinics operating within tight budget constraints, price competitiveness and price-quality congruence are critical evaluation criteria shaping procurement decisions and long-term supplier loyalty [7], [8].

Consumer satisfaction, conceptualized as the evaluative response derived from comparing perceived service performance against pre-purchase expectations (Oliver's Expectancy-Disconfirmation Theory, 2022), is a foundational construct in marketing and supply chain management [9], [10]. In pharmaceutical wholesale distribution, satisfaction encompasses the extent to which clients perceive that their drug supply needs, logistical expectations, and pricing requirements have been adequately met. Satisfied clients demonstrate greater loyalty, reduced switching behavior, and increased willingness to recommend the distributor to peer facilities [3], [11].

PT Cipta Viriya Guna, a licensed PBF established in 2014 and operating from Tangerang, Banten, serves clinic and pharmacy clients across the greater Jakarta metropolitan area. Internal complaint data for 2024 revealed 485 delivery-related and 186 price-related complaints across 12 months, with peak complaint volumes in January and July (58 complaints each). Concurrently, client attrition data documented consumer and revenue declines of up to 4% in peak complaint months (Company Data, 2024).

The novelty of this study is grounded in a documented gap in the literature. While previous studies have examined delivery performance in logistics and e-commerce contexts [5], [12], and price perception in retail pharmacy settings [7], [8], no published study in the Scopus or Google Scholar-indexed literature has simultaneously investigated both delivery duration and drug price as predictors of consumer satisfaction in a private Indonesian PBF (pharmaceutical wholesale distributor). The closest existing studies either focused on hospital pharmacy supply chains (Gizaw et al., 2021 [3]; Masudin et al., 2022 [4]) or retail pharmacy consumer behavior (Luh et al., 2024 [7]; Putri et al., 2024 [8]), neither of which captures the institutional B2B procurement dynamics of a private PBF. This study, therefore, provides the first empirical evidence from a private pharmaceutical wholesale distributor in Indonesia on the relative and combined contributions of delivery duration and drug price to consumer satisfaction - filling a specific contextual and methodological gap.

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Conceptual Framework. The conceptual model underpinning this study posits that Delivery Duration (X1) and Drug Price (X2) function as independent predictors of Consumer Satisfaction (Y), both individually (partial effects) and jointly (simultaneous effect). This model is grounded in three theoretical foundations: (1) Logistics Service Quality Theory (Zeithaml et al., 2023 [11]; Li et al., 2023 [12]), which identifies delivery reliability as a direct antecedent of customer satisfaction; (2) Price Perception Theory (Kotler & Keller, 2021 [10]; Putri et al., 2024 [8]), which frames price evaluation as a multi-dimensional cognitive appraisal encompassing affordability, value congruence, and competitiveness; and (3) Oliver's (2022) Expectancy-Disconfirmation Theory [9], which positions consumer satisfaction as the outcome of comparing perceived performance against prior expectations.

2 Methods

2.1 Study Design and Setting

This study employed quantitative cross-sectional survey design with a descriptive-explanatory approach. Data was collected at a single point in time from institutional clients of PT Cipta Viriya Guna (Jl. Bakti Saham, Tangerang, Banten), a licensed PBF operating across the greater Jakarta-Banten metropolitan area. The cross-sectional design is appropriate for identifying associations between delivery duration, drug price, and consumer satisfaction at a single measurement point; however, given this design, all findings are interpreted as associations rather than causal relationships, consistent with the epistemological limitations of cross-sectional research (Sugiyono, 2021 [13]). The study period spanned April to May 2025.

2.2 Population and Sampling

The study population comprised all 372 registered institutional clients of PT Cipta Viriya Guna. Using the Slovin formula with a tolerable margin of error of 5% (e = 0.05), the minimum required sample size was calculated as:

$$n = N / (1 + N \times e2) = 372 / (1 + 372 \times 0.052) = 193 \text{ respondents}$$

Systematic random sampling was employed: the sampling frame consisted of the complete client registration list maintained by PT Cipta Viriya Guna's operations department (N = 372). A sampling interval of k = 372/193 = approximately 2 was computed, and every second client on the alphabetically ordered client list was selected, beginning from a randomly determined starting point. This procedure ensured equal selection probability and systematic coverage of the full client population. Respondents were owners, licensed pharmacists-in-charge, or procurement officers who had used PT Cipta Viriya Guna's services at least three times in the preceding three months and provided informed consent. Respondents who had not purchased from the company or refused consent were excluded [13].

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2.3 Instruments

Three Likert-scale questionnaire instruments were used. Consistent with the four-point scale format used by Huda (2023) [14] for delivery logistics assessment and Putri et al. (2024) [8]for price perception in pharmacy settings, all items used a four-point response format anchored at 1 = Very Satisfied and 4 = Not Satisfied. This reverse-scored design means that higher total scores reflect lower satisfaction. Readers should note that this scale directionality is critical for interpreting regression coefficients: a negative beta for Delivery Duration (X1) indicates that as delivery duration increases (implying worse performance), satisfaction scores increase numerically (i.e., satisfaction decreases perceptually); conversely, a positive beta for Drug Price (X2) is interpreted within this reversed scale and reflects that higher price dissatisfaction co-occurs with higher numerical satisfaction scores (see Section 3.7 for detailed interpretation). Delivery Duration (X1) was assessed using 9 items across three indicators: timeliness of delivery, scheduling reliability, and travel time accuracy [14]. Drug Price (X2) was assessed using 12 items across four indicators: price affordability, price-quality correspondence, price-benefit correspondence, and price competitiveness [8]. Consumer Satisfaction (Y) was assessed using 9 items across three indicators: expectation congruence, repurchase intention, and willingness to recommend [7].

Instrument validity was confirmed through Pearson correlation in a pilot sample of 30 respondents; all items yielded r-values exceeding the critical r-table threshold of 0.361 (alpha = 0.05, df = 28). Reliability was assessed via Cronbach's alpha, with all three scales exceeding the acceptable threshold of 0.60.

2.4 Data Collection

Questionnaires were administered electronically via Google Form and distributed to respondents through WhatsApp. Responses were entered into Microsoft Excel, quality-checked for completeness and consistency, coded, and exported to IBM SPSS Statistics (Version 26) for analysis.

2.5 Statistical Analysis

Descriptive analysis generated frequency distributions and percentages for demographic characteristics. Prior to regression analysis, three classical assumption tests were performed: (1) Kolmogorov-Smirnov test for normality; (2) Variance Inflation Factor (VIF) and tolerance values for multicollinearity; and (3) scatterplot visual inspection for heteroskedasticity. Multiple linear regression was then applied, with hypothesis testing comprising: (1) partial t-test for individual variable associations; (2) simultaneous F-test for combined model significance; and (3) the coefficient of determination (R^2) to quantify explained variance. Statistical significance was set at alpha = 0.05.

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2.6 Ethical Considerations

Managerial approval was obtained from PT Cipta Viriya Guna's leadership prior to data collection. All respondents were informed of study objectives and their right to decline participation. Respondent identities were anonymized and data were used exclusively for academic purposes.

3 Results and Discussion

3.1 Respondent Characteristics

A total of 193 respondents participated, representing clinic (57.0%) and pharmacy (43.0%) client entities. Male respondents predominated (54.9%), and the majority were aged 21-25 years (58.0%). Healthcare professionals accounted for 73.1% of respondents. Most respondents (46.6%) reported monthly incomes of IDR 1.5-4.4 million. Full respondent characteristics are presented in Table 1.

Table 1. Respondent Characteristics (n = 193)

Characteristic	Category	Frequency (n)	Percentage (%)
Business Type	Clinic	110	57.0
	Pharmacy	83	43.0
Gender	Male	106	54.9
	Female	87	45.1
Age Group	21-25 years	112	58.0
	26-30 years	44	22.8
	31-35 years	19	9.8
	>36 years	18	9.3
Occupation	Healthcare professional	141	73.1
	Owner / Manager	17	8.8
	Administrative staff	35	18.1
Monthly Income	IDR 1.5-4.4 million	90	46.6
	IDR 4.5-7.4 million	70	36.6
	> IDR 7.5 million	33	17.1

3.2 Instrument Quality

All items in the three instruments yielded Pearson r-values above 0.361 ($p < 0.05$), confirming item-level validity. Cronbach's alpha coefficients exceeded 0.80 for all three scales, indicating excellent reliability (Table 2).

Table 2. Reliability Statistics for Study Instruments (n = 193)

Variable	Items (n)	Cronbach's Alpha	Reliability Status
Delivery Duration (X1)	9	0.917	Reliable
Drug Price (X2)	12	0.860	Reliable

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Consumer Satisfaction (Y)	9	0.910	Reliable

3.3 Classical Assumption Tests

The Kolmogorov-Smirnov test yielded Asymp. Sig. (2-tailed) = 0.200 (> 0.05), confirming normality of residuals. Multicollinearity diagnostics showed tolerance = 0.932 and VIF = 1.073 for both X1 and X2, well within acceptable thresholds. Scatterplot inspection revealed no systematic residual pattern, confirming homoscedasticity. All classical assumptions were met (Table 3).

Table 3. Classical Assumption Test Results

Test	Statistic	Value	Conclusion
Normality (Kolmogorov-Smirnov)	Asymp. Sig. (2-tailed)	0.200 (> 0.05)	Normally distributed
Multicollinearity - X1	Tolerance / VIF	0.932 / 1.073	No multicollinearity
Multicollinearity - X2	Tolerance / VIF	0.932 / 1.073	No multicollinearity
Heteroskedasticity (Scatterplot)	Pattern of residuals	No clear pattern	Homoscedastic

3.4 Partial Associations: t-test Results (H1 and H2)

Table 4 presents the multiple linear regression coefficients and partial t-test results. The derived regression equation is:

$$\text{Consumer Satisfaction (Y)} = 14.187 - 0.128\ X1 + 0.210\ X2$$

Delivery Duration (X1) yielded t = -6.262 (p = 0.000; t-table = 1.972), confirming a significant negative partial association with consumer satisfaction (H1 accepted). Drug Price (X2) yielded t = 8.166 (p = 0.000), confirming a significant positive partial association with consumer satisfaction (H2 accepted).

Table 4. Multiple Linear Regression Coefficients and Partial t-Test Results (n = 193)

Variable	B	Std. Error	Beta (β)	t-value	p-value
(Constant)	14.187	0.599	—	23.684	0.000*
Drug Price (X2)	0.210	0.026	0.507	8.166	0.000*
Delivery Duration (X1)	-0.128	0.020	-0.389	-6.262	0.000*

Note: Dependent variable = Consumer Satisfaction (Y); t-table (df = 190, alpha = 0.05) = 1.972; * p < 0.05. Scale note: The instrument uses a reverse-scored 4-point scale (1 = Very Satisfied; 4 = Not Satisfied); negative beta for X1 and positive beta for X2 must be interpreted accordingly (see Section 3.7).

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3.5 Simultaneous Associations: F-test and R2 (H3)

The simultaneous F-test yielded F = 43.015 (p = 0.000; F-table = 3.04), confirming that delivery duration and drug price jointly and significantly associated with consumer satisfaction (H3 accepted). R2 = 0.312 indicates that the two variables together explain 31.2% of satisfaction variance. Adjusted R2 = 0.305 confirms model fit when adjusting for the number of predictors (Tables 5 and 6).

Table 5. Simultaneous F-Test Results (ANOVA)

Source	Sum of Squares	df	F-value	p-value
Regression	102.368	2	43.015	0.000*
Residual	226.086	190	—	—
Total	328.454	192	—	—

Table 6. Coefficient of Determination (Model Summary)

Model	R	R Square	Adjusted R Square
1 (Delivery Duration + Drug Price)	0.558	0.312	0.305

3.6 Association of Delivery Duration with Consumer Satisfaction

Consistent with a cross-sectional associational interpretation, delivery duration showed a significant negative association with consumer satisfaction (beta = -0.389, t = -6.262, p = 0.000). On the reverse-scored 4-point scale, this negative coefficient indicates that longer delivery durations (higher X1 scores) are associated with higher numerical satisfaction scores, which on this scale reflect lower perceived satisfaction. This association is operationally meaningful: longer delivery times directly compromise the continuity of pharmacies and clinics depending on reliable restocking cycles. When deliveries exceed the promised 24-hour window, client facilities may face drug dispensing interruptions, patient treatment delays, and reactive procurement from alternative suppliers.

This finding is consistent with Gizaw et al. [3], who demonstrated that delivery reliability was the strongest predictor of pharmaceutical supply chain customer satisfaction. Rashid and Rasheed [5] found that delivery time was a primary driver of satisfaction in e-commerce logistics, with delays generating disproportionately negative responses. Masudin et al. [4] confirmed that responsiveness in pharmaceutical logistics significantly predicts customer loyalty through satisfaction mediation.

The seasonal complaint pattern at PT Cipta Viriya Guna (peaks in January and July) is consistent with demand surge-related logistics strain. Specifically, January peaks likely reflect post-holiday restocking surges as pharmacies and clinics deplete buffer stock over festive periods, while July peaks align with mid-year budget reallocation cycles that trigger bulk ordering. Evidence-based operational interventions for PT Cipta Viriya Guna include: (1) implementation of dynamic route optimization software (e.g., network-based routing with real-time traffic data) to reduce delivery cycle times by an estimated 15-20% during peak demand [12]; (2) expansion of dedi-

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cated delivery fleet capacity during identified peak months (January, July) using contract-vehicle arrangements rather than permanent fleet investment; (3) establishment of a client communication protocol for proactive delay notification (minimum 2 hours in advance), which Rashid and Rasheed [5] demonstrated reduces satisfaction impact of delays by 30%; and (4) introduction of priority delivery tiers for cito (emergency) orders with guaranteed 4-hour delivery windows for affiliated clinic clients.

3.7 Association of Drug Price with Consumer Satisfaction

Drug price showed a significant positive association with consumer satisfaction (beta = 0.507, t = 8.166, p = 0.000). The higher standardized beta coefficient of price (0.507) compared to delivery duration (-0.389) indicates that price perception is a somewhat stronger correlate of satisfaction in this B2B pharmaceutical procurement context. This finding is theoretically explicable from a supply chain procurement perspective: institutional buyers (pharmacies, clinics) operate under fixed reimbursement structures from BPJS Kesehatan and private insurance schemes, making drug acquisition costs a binding budget constraint. Price dissatisfaction in this context triggers faster switching behavior than delivery dissatisfaction, because price differences can be immediately quantified in procurement budgets, whereas delivery delays are tolerated within operational buffers. This asymmetric sensitivity to price versus delivery dissatisfaction in B2B pharmaceutical procurement has been documented by Gizaw et al. [3] and aligns with organizational buying behavior theory (Kotler & Keller, 2021 [10]).

Critical interpretation of the positive beta direction: The positive beta for price (0.507) must be interpreted within the reverse-scored 4-point scale. Higher X2 values (e.g., responding 3 or 4) reflect greater price dissatisfaction, and their association with higher Y values (also reflecting lower satisfaction) produces a mathematically positive coefficient. This does NOT imply that higher prices increase satisfaction. Rather, it confirms that clients who are more dissatisfied with prices are also more dissatisfied overall - a directionally consistent finding when the scale reversal is accounted for. Authors strongly recommend that future research in this domain adopt a standard 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to eliminate this interpretive complexity and improve cross-study comparability.

This result aligns with Luh et al. [7], who found that price perception was a significant predictor of pharmacy customer satisfaction. Putri et al. [8] similarly demonstrated that price had a significant negative effect on satisfaction when clients perceived price as unfavorably high. For PT Cipta Viriya Guna, practical price management strategies should include: (1) introduction of tiered volume discount structures for clients ordering above defined monthly thresholds (e.g., IDR 10 million/month), providing a tangible price advantage over spot purchasing; (2) transparent price change communication protocol requiring 14-day advance notice to clients of any price adjustments exceeding 5%, with written justification citing raw material cost drivers; and (3) annual price benchmarking against top 3 competitor PBFs in the Tangerang-Jakarta corridor, with internal pricing reviews triggered when the company's price index exceeds competitors by more than 8% on high-volume product categories.

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3.8 Simultaneous Associations and Model Fit

The simultaneous F-test confirmed that delivery duration and drug price are jointly and significantly associated with consumer satisfaction ($F = 43.015$, $p = 0.000$), validating H3. The coefficient of determination ($R2 = 0.312$) indicates that these two variables collectively explain 31.2% of satisfaction variance. The remaining 68.8% of unexplained variance is explicitly acknowledged as attributable to omitted variables. Based on the pharmaceutical supply chain satisfaction literature, the most theoretically and empirically plausible omitted variables include: (1) service quality (responsiveness, assurance, empathy of sales and delivery staff) - documented by Gizaw et al. [3] as accounting for 18-22% of additional satisfaction variance; (2) order accuracy (correct drug type, dosage, and quantity per order) - identified by Hu et al. [15] as a primary satisfaction driver in pharmaceutical e-commerce; (3) relationship quality (trust, commitment, and interpersonal quality between PBF sales representatives and client procurement officers) - documented as explaining 12-15% of B2B satisfaction variance in wholesale contexts; and (4) digital ordering platform usability (Limbu & Huhmann, 2024 [16]). Future research should incorporate these variables in an expanded model to improve explanatory completeness.

This finding parallels Atmoko [17], who reported that timeliness of delivery and price simultaneously predicted consumer satisfaction at a logistics company, and Widayati et al. [18], who found significant simultaneous associations of delivery speed and service quality with satisfaction.

3.9 Practical Implications

The following recommendations are directly grounded in the empirical findings and calibrated to the specific operational context of PT Cipta Viriya Guna: (1) Delivery Performance Management System: Given beta = -0.389 (the second strongest predictor), PT Cipta Viriya Guna should implement a structured delivery monitoring dashboard tracking three KPIs on a weekly basis: on-time delivery rate (target: >95% of orders delivered within 24 hours), mean order cycle time (target: <8 hours for standard orders, <4 hours for cito orders), and complaint-to-delivery ratio (target: <2 complaints per 100 deliveries). This dashboard should be reviewed weekly by operations management and shared monthly with client-facing sales staff to enable proactive client relationship management. (2) Pricing Strategy Formalization: Given that price (beta = 0.507) is the strongest predictor of satisfaction, a formal pricing governance structure should be established, comprising: (a) annual competitor price benchmarking for the top 50 product SKUs by revenue volume; (b) volume-based tiered pricing tiers at three levels (standard, preferred, and strategic partner); and (c) a dedicated key account manager role for the top 20% of clients by order value, with authority to negotiate customized pricing arrangements. (3) Digital Transformation: Integration of a digital ordering and tracking platform (such as a WhatsApp Business API-integrated order management system or a lightweight ERP module) would simultaneously improve delivery transparency, order accuracy tracking, and client communication - addressing both the delivery and price communication gaps identified in this study.

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3.10 Limitations

This study carries several limitations that should temper interpretation of findings. First, the cross-sectional design captures satisfaction at a single time point and cannot establish causal directionality; all findings should be interpreted as associations, not effects. Second, the study was conducted within a single PBF in the Tangerang area, limiting generalizability to other PBFs in different geographic or operational contexts. Third, the four-point reverse-scored response scale creates interpretive complexity and differs from the standard 5-point Likert scale widely used in satisfaction research, which may limit cross-study comparability. Future research should adopt standard directional scaling. Fourth, the model explains only 31.2% of satisfaction variance, indicating that significant omitted variables (service quality, order accuracy, relationship quality, digital usability) should be incorporated in future multi-variable models. Fifth, perceptual measures of delivery duration and price were used; future studies should complement these with objective operational data (e.g., logistics GPS timestamps, actual invoice price comparisons) to strengthen construct validity.

4 Conclusion

This study provides the first empirical evidence from a private Indonesian pharmaceutical wholesale distributor (PBF) demonstrating that both delivery duration and drug price are significantly associated with consumer satisfaction. Delivery duration showed a significant negative partial association (beta = -0.389, p = 0.000), confirming that shorter, more reliable delivery cycles are associated with higher client satisfaction. Drug price showed a significant positive partial association (beta = 0.507, p = 0.000) within the reverse-scored instrument; the stronger beta magnitude of price reflects the primacy of price dissatisfaction in B2B pharmaceutical procurement decision-making, consistent with organizational buying behavior theory. Simultaneously, both variables accounted for 31.2% of satisfaction variance (F = 43.015, p = 0.000; Adjusted R2 = 0.305). PT Cipta Viriya Guna and the broader PBF sector in Indonesia should prioritize logistical efficiency improvements - particularly during peak demand months of January and July - and transparent, competitively benchmarked pricing strategies to sustain client satisfaction, reduce attrition, and strengthen competitive positioning in the pharmaceutical supply chain.

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6 Conflict of Interest

The authors declare no conflict of interest. This research received no external funding and was conducted as part of an undergraduate thesis program at STIKes Widya Dharma Husada Tangerang.

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