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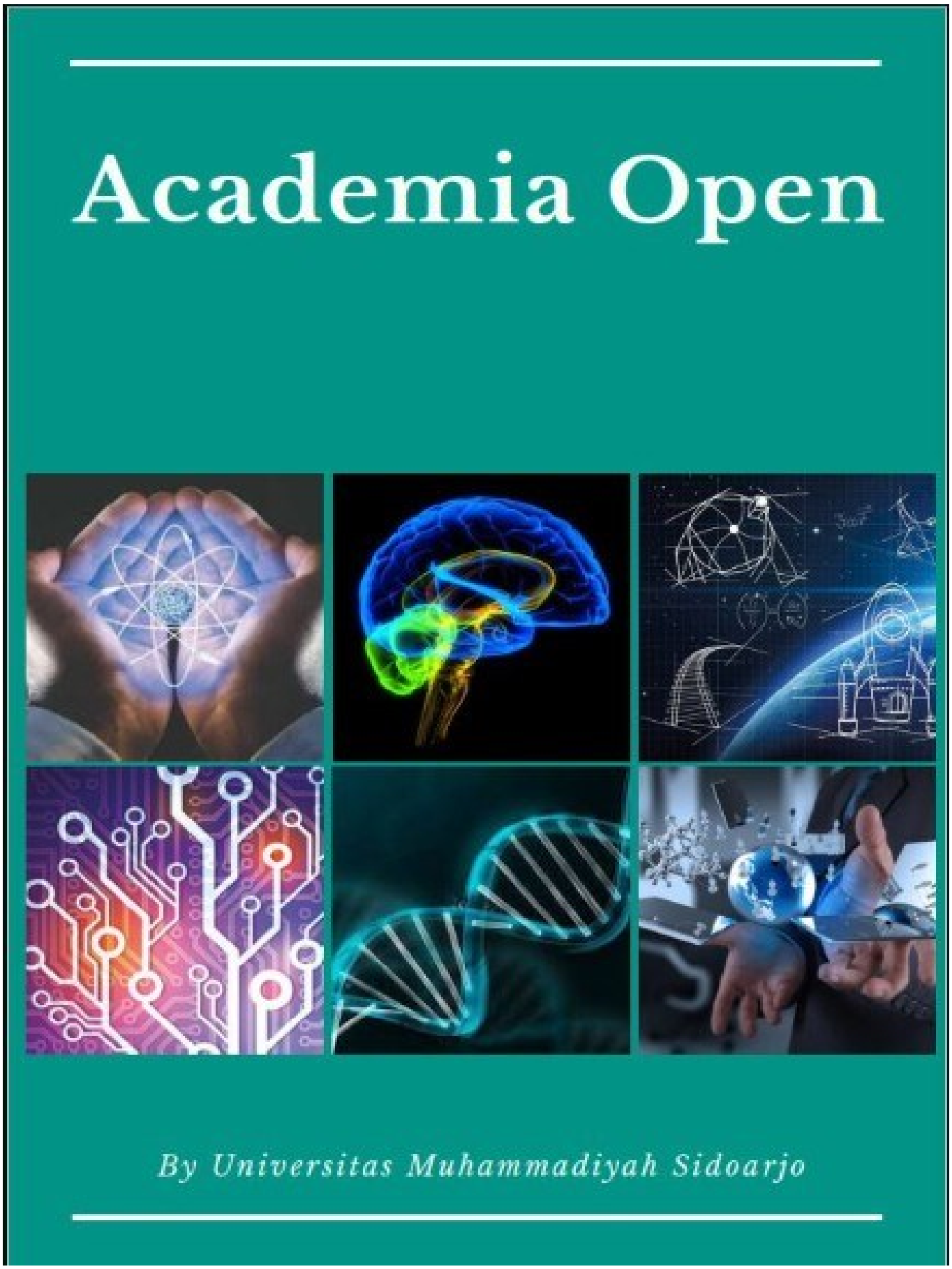

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Price Dominance on Loyalty and Repurchase of Bottled Water

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Abstract

General Background: Bottled water is an essential consumer product in urban markets, where intense competition requires firms to understand purchase decisions, brand loyalty, and repurchase intention. **Specific Background:** A new bottled water brand faced competitive pressure from established brands, low brand familiarity, promotional challenges, and a reputation issue related to consumer doubts about product quality and water source clarity. **Knowledge Gap:** Previous bottled water studies have reported inconsistent findings regarding brand image, brand awareness, price, and promotion in shaping purchase decisions, loyalty, and repeat buying behavior. **Aims:** This study aimed to analyze the relationships between brand image, brand awareness, price, promotion, purchase decision, brand loyalty, and repurchase intention for bottled water consumers. **Results:** Using survey data from 180 respondents and Covariance Based Structural Equation Modeling with AMOS 26, the study found that brand image and price significantly related to purchase decisions, while brand awareness and promotion were not significant. Brand awareness and price significantly related to brand loyalty, whereas brand image and promotion were not significant. Price was the only external variable with a significant direct relationship with repurchase intention. Purchase decision significantly related to brand loyalty, and brand loyalty significantly related to repurchase intention. **Novelty:** This study develops an integrated bottled water consumer behavior model under brand crisis and competitive marketing conditions. **Implications:** The findings suggest that competitive pricing, stable brand familiarity, reliable product experience, and stronger loyalty-building programs are central to sustaining repeat consumption.

Highlights:

- Brand reputation and pricing shaped initial buying choice.
- Familiarity and price stability supported long-term attachment.
- Repeat consumption depended mainly on loyalty formation.

Keywords: Bottled Water, Brand Loyalty, Purchase Decisions, Repurchase Intention

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Introduction

The need for clean water positions Bottled Water (*Air Minum Dalam Kemasan* or AMDK) as an essential commodity for modern society. Based on the 2023 National Socioeconomic Survey (Susenas) data, 40.64% of Indonesians consume bottled water daily, and this figure surges drastically to 96.01% in urban areas like Surabaya [1], [2]. This high demand has triggered massive industry growth while creating fierce market competition, as evidenced by the thousands of bottled water products registered with the Indonesian Food and Drug Authority / BPOM [3]. In this dynamic market landscape, producers are required to precisely understand the drivers of consumer behavior to maintain market share and win the competition. Therefore, continuous evaluation of market dynamics is imperative, as the massive proliferation of domestic brands intensifies the struggle for consumer attention and long-term retention [3], [1].

As a new player launched by a leading Fast-Moving Consumer Goods (FMCG) company, BW X faces an existential challenge in penetrating the dominance of established brands. Building brand awareness from scratch is a crucial initial foundation, as consumers often rely on familiar brands to reduce perceived risks and fulfill broader social or emotional values in daily consumption products [4]. However, amidst these introductory efforts, BW X was confronted with a reputation crisis due to a viral negative issue on social media platforms regarding doubts about its water quality and source clarity. This issue directly threatens the brand image of BW X, which theoretically heavily influences the level of consumer trust, a fundamental basis for consumers in evaluating an AMDK brand before making a purchase decision [5].

To systematically evaluate the complex dynamics among a tested brand image, low brand awareness, competitive pricing, and promotional offers, this study draws upon two foundational frameworks: Customer-Based Brand Equity (CBBE) and the Theory of Planned Behavior (TPB). According to the CBBE framework, brand awareness (salience) and brand image (meaning) act as cognitive building blocks that shape the initial purchase decision and eventually culminate in brand loyalty (resonance) [6], [7]. Once this loyalty is established, TPB provides a mechanism to understand how this profound commitment (acting as a positive attitude), combined with pragmatic evaluations of price and promotion (acting as perceived behavioral control), dictates the ultimate behavioral outcome: repurchase intention. Furthermore, empirical evidence supports that a well-perceived brand image has a significant impact on continuously driving consumers' repurchase intentions through loyalty [8].

Various prior literatures have examined the relationships between these marketing variables and consumer behavior, yet they show inconsistent results. There is an academic debate where s study found that brand image has a dominant effect on purchase decisions in the bottled water industry [9] while other studies emphasized the price and promotion factors more, stating that brand image is insignificant [10], [11]. Conversely, other research indicates that brand awareness, brand image, price, and promotion simultaneously exert a significant influence on purchase decisions [12]. The novelty of this study lies in its unique context and comprehensive approach: it explicitly evaluates consumer behavior toward a new brand navigating a viral reputation crisis alongside aggressive promotional strategies, translating these complex dynamics into predictive mathematical model. Therefore, the purpose of this study is to investigate the influence of brand image, brand awareness, price, and promotion on purchase decisions, brand loyalty, and repurchase intentions related to BW X products. It also aims to analyze the impact of purchase decisions on brand loyalty and how brand loyalty affects repurchase intentions. By examining these relationships, the study seeks to provide a comprehensive understanding of the key factors driving consumer behavior toward BW X in Surabaya. Additionally, the research intends to develop a mathematical model that accurately represents the interactions between these variables. This model will serve as a valuable tool for predicting and enhancing customer loyalty and repurchase behavior.

Method

This study employed a quantitative approach using a survey method through the distribution of a 5-point Likert scale questionnaire (ranging from 1 = Strongly Disagree to 5 = Strongly Agree). The sample size determination technique referred to the Maximum Likelihood Estimation (MLE) guidelines, which require a representative sample of 100 to 200 observational units to maintain estimation stability and statistical power [13]. The respondents were selected using a purposive sampling technique, with the specific criteria for inclusion were individuals residing in Surabaya who have purchased BW X at least once.

In this study, brand image is measured through brand benefit and competence, brand association, and reputation [14],[15]. The operational indicators for brand awareness include brand recall, brand salience during consumption, brand recognition, and likeability [16], [17]. Price is assessed based on affordable price, competitive price, price-quality alignment, and price-benefit alignment [18]. The promotion variable is evaluated through media, frequency, quality of message, promotional reach, attractive gift offers, and discount amount [19]–[21]. Purchase decision is measured using indicators such as product attachment, recommendations to others, brand choice, and distributor choice [22], [23]. Loyalty is assessed through satisfaction, brand linkage, prioritizing the brand, and recommending the brand to others [24], [25]. Lastly, repurchase intention is measured by continuous consumption, sharing experiences, trust, reliability, and functionality [26], [27].

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The collected data were analyzed using the Covariance-Based Structural Equation Modeling (CB-SEM) approach with the assistance of AMOS software. This approach was selected due to its advantage in simultaneously testing unnomplex theoretical models [28]. Before evaluating the structural relationships, the data underwent classical assumption tests. Multivariate normality was assessed using the Critical Ratio (C.R.) of multivariate kurtosis, while multivariate outliers were detected using the Mahalanobis distance (D^2) criterion. Following the assumption tests, the data were evaluated through a measurement model (Confirmatory Factor Analysis) to ensure the validity and reliability of the instruments. Convergent validity is met if the loading factor (π) value is significant and the Critical Ratio (CR) > t_{table}, while discriminant validity was tested by comparing the correlation values between constructs. Furthermore, inter-item correlations were examined to detect potential multicollinearity, ensuring correlation coefficients remained below 0.8, while internal consistency was confirmed when the construct reliability value met the minimum threshold of ≥ 0.70 [13].

Once the instruments were declared valid and reliable, the testing proceeded to the structural model to evaluate the causality among variables. The feasibility of the theoretical model was evaluated using comprehensive Goodness of Fit criteria. In instances where the initial structural model failed to meet these stringent fit criteria, model modifications were executed by referring to the Modification Indices (MI), provided that the Standardized Residual values were maintained within the acceptable boundary of -2.58 to 2.58. Ultimately, once the modified model achieved an ideal fit, hypothesis testing was conducted by analyzing the direction, magnitude, and statistical significance of the standardized path coefficients within the simultaneous equation model.

According to [13] model is considered fit with the empirical data if it meets the following criteria, as presented in table 1.

Table 1. Cut-Off Value of GoF Index [13]

Goodness of fit Index	Cut-Off Value
X^2 Chi Square	expected to be minimal
Probabilitas	≥ 0,05
CMIN/DF	≤2,00
RMSEA	≤0,08
GFI	≥ 0,90
AGFI	≥ 0,90
TLI	≥ 0,95
CFI	≥ 0,95

Results and Discussion

A. Respondents Profile

The questionnaire was distributed throughout the Surabaya area using Google Forms, targeting respondents who met the criteria of having purchased BW X products at least once. The table 2 presents the analysis of the respondents' characteristics.

Table 2. Respondent's Highest Level of Education

Highest Level of Education	Frequency	Percentage
Elementary/Junior High School	4	2%
High School/Equivalent	72	40%
Diploma I - Diploma III	71	39%
Diploma IV – Bachelor's Degree	30	17%
Master's/Doctorate	3	2%
Total	**180**	**100%**

From table 2, respondents' highest level of education shows that the majority, 40%, have completed high school or an equivalent. Close behind, 39% of respondents hold a diploma ranging from Diploma I to Diploma III. Additionally, 17% have attained a Diploma IV or Bachelor's degree, while only a small portion, 2%, have completed elementary or junior high school. Similarly, 2% of respondents hold a Master's or Doctorate degree. This distribution indicates that most respondents have education levels ranging from secondary to undergraduate, reflecting a relatively well-educated sample.

In addition, table 3 presents the occupations of the respondents. The data in this table shows a variety of jobs held by respondents. Thus information provides a more comprehensive picture of socio-economic backgrounds of the respondents participating in this study.

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Table 3. Respondent's Employment Status

Employment	Frekuensi	Persentase
Student	5	3%
College Student	74	41%
Freelancer	32	18%
Civil Servant	46	26%
Unemployed	8	4%
Other	15	8%
Total	**180**	**100%**

From table 3, the employment status of the respondents reveals that the largest group, 41%, are college students, followed by 26% who are civil servants. Freelancers make up 18% of the respondents, while unemployed individuals account for 4%. A smaller portion, 3%, are students, and 8% fall into other employment categories. Overall, this distribution shows a diverse range of employment backgrounds, with a strong representation from the student and civil servant populations.

B. Assumption Tests

Prior to evaluating the structural model, data screening was conducted to ensure the dataset met the required assumptions for CB-SEM analysis, specifically regarding multivariate outliers and normality.

1. Multivariate Outlier Test

The detection of multivariate outliers was performed using the Mahalanobis distance (D^2) criterion. Given that the model consists of 30 indicators, the Chi-square threshold at a significance level of $p < 0.001$ and $df = 30$ is 59.703. The results of the normality assessment, including the skewness and kurtosis coefficients for each indicator as well as the multivariate critical ratio, are summarized in Table 4.

Table 4. Assesment of Univariate and Multivariate Normality

Observation number	D^2	P1	P2
45	67,478	,000	,019
126	66,843	,000	,000
169	61,782	,001	,000
44	61,249	,001	,000
62	60,840	,001	,000

Based on the table 4, five observations (numbers 45, 126, 169, 44, and 62) were identified as exceeding this threshold, with the highest D^2 value being 67.478. However, these observations were retained in the analysis as they represent genuine variations in consumer behavior toward the brand, and their inclusion ensures the representativeness of the sample.

2. Normality Test

The normality of the data was assessed through univariate and multivariate normality tests. The results of the normality assessment, including the skewness and kurtosis coefficients for each indicator as well as the multivariate critical ratio, are summarized in Table 5.

Table 5. Assessment of Normality

Variable	min	max	skew	c.r.	kurtosis	c.r.
Y3.5	2,500	5,000	-,989	-5,417	,750	2,054
Y3.4	2,400	4,800	-1,207	-6,609	1,442	3,949
Y3.3	2,670	5,000	-,611	-3,346	-,359	-,984
Y3.2	2,000	5,000	-,622	-3,409	,364	,996
Y3.1	3,000	5,000	-,773	-4,231	-,406	-1,111
Y2.4	2,330	5,000	-,953	-5,219	,600	1,643
Y2.3	2,500	4,750	-,674	-3,691	-,119	-,327
Y2.2	2,500	5,000	-,868	-4,755	,404	1,106
Y2.1	2,500	5,000	-,885	-4,849	,794	2,174
Y1.4	2,500	5,000	-,615	-3,367	-,366	-1,003
Y1.3	2,330	5,000	-1,031	-5,644	,841	2,302
Y1.2	2,250	4,750	-,868	-4,753	,298	,816
Y1.1	2,000	5,000	-1,238	-6,779	1,669	4,570

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X4.6	2,750	5,000	-1,278	-6,999	1,689	4,626
X4.5	2,500	5,000	-,917	-5,024	,883	2,418
X4.4	2,330	5,000	-,902	-4,943	,162	,443
X4.3	2,500	5,000	-,873	-4,782	,375	1,026
X4.2	3,000	5,000	-,835	-4,573	-,200	-,548
X4.1	2,330	5,000	-1,217	-6,665	1,081	2,961
X3.4	2,670	5,000	-1,095	-5,998	,917	2,512
X3.3	2,000	5,000	-,923	-5,056	,654	1,791
X3.2	2,000	5,000	-1,122	-6,147	1,338	3,664
X3.1	2,000	5,000	-1,169	-6,403	,836	2,290
X2.4	2,670	5,000	-,937	-5,133	,126	,345
X2.3	3,000	4,800	-1,013	-5,549	,424	1,160
X2.2	2,330	5,000	-,662	-3,627	-,181	-,495
X2.1	2,500	5,000	-,572	-3,132	-,274	-,749
X1.3	2,000	5,000	-,828	-4,537	,247	,675
X1.2	1,500	5,000	-1,143	-6,261	1,554	4,257
X1.1	2,250	4,750	-1,430	-7,833	1,788	4,897
Multivariate					110,756	16,956

Based on Table 5, the multivariate Kurtosis critical ratio (c.r.) was 16.956, which is above the ±2.58 threshold, indicating that the assumption of multivariate normality was not strictly met. However, univariate normality was maintained, as all items exhibited skewness values between -1.430 and -0.572 and kurtosis values between -0.495 and 1.788. According to [29], data distributions with skewness and kurtosis coefficients within the range of ±2.0 are considered acceptable and do not severely deviate from the normal distribution, particularly in large-scale assessments. Since all indicators in this study fell within these specified limits, the data were deemed suitable for further analysis using Maximum Likelihood (ML) estimation, which is known to be robust to moderate non-normality when univariate distributions are within acceptable boundaries.

C. Path Diagram

As a fundamental step in Covariance-Based Structural Equation Modeling (CB-SEM), the conceptual model was visualized through a path diagram using AMOS. This diagram precisely maps the causal relationships between four exogenous variables (Brand Image, Brand Awareness, Price, and Promotion) and three sequential endogenous variables (Purchase Decision, Brand Loyalty, and Repurchase Intention) representing BW X consumer behavior. This visualization serves as the mathematical foundation for estimating regression coefficients and evaluating the overall goodness of fit. The path diagram is presented as follows, as shown in figure 1.

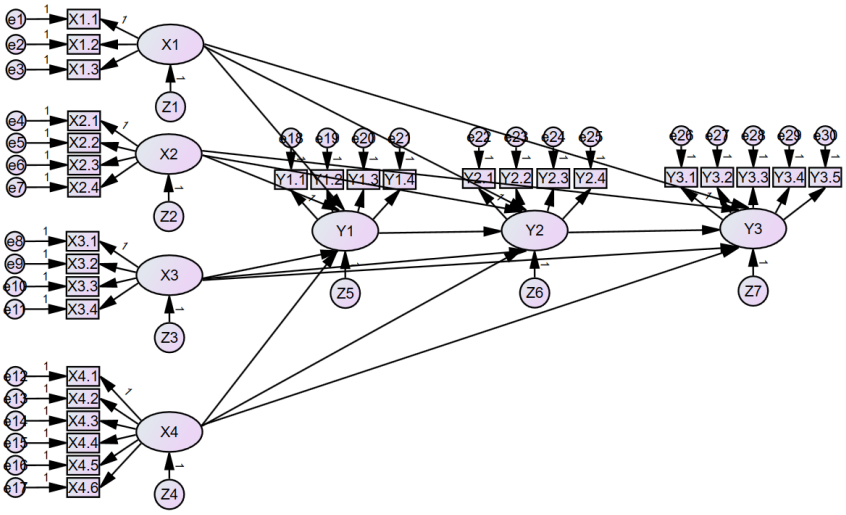

Figure 1. Path diagram Purchase Decision, Brand Loyalty, and Repurchase Intention BW X in Surabaya

D. Measurement Model

To test the causal relationships, the instrument's feasibility was evaluated through a measurement model using CB-SEM via AMOS 26 software. Shown in figure 2, displays the measurement model used in this study.

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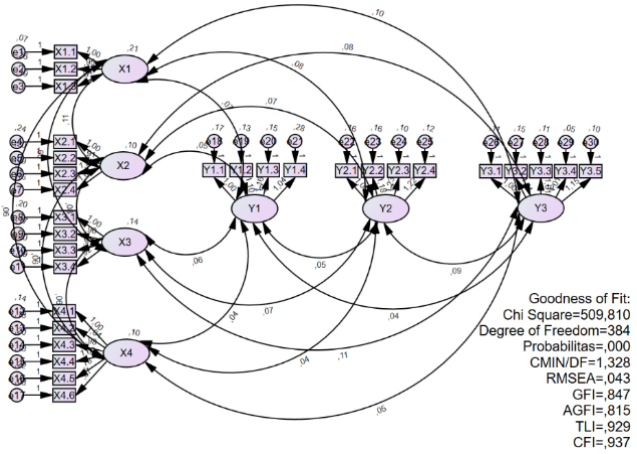

Figure 2. Measurement Model of Purchase decision, Brand loyalty, dan Repurchase intention BW X in Surabaya

The feasibility of the instrument and the Goodness of Fit of the measurement model were rigorously evaluated ahead of casual testing. The initial measurement model demonstrated a good fit in several key criteria, specifically CMIN/DF (1.328 ≤ 2.00) and RMSEA (0.043 ≤ 0.08). Although the Chi-Square was significant (509.801) and certain comparative indices were marginal (GFI = 0.847, AGFI = 0.815, TLI = 0.929, CFI = 0.937), the model remains statistically viable. This confirming excellent internal consistency and qualifying the data for subsequent structural refinement. Validity and significance tests of the research instrument were conducted, as presented in table 4.

Table 6. Validity and Significancy Test of indicators

			Estimate	S.E.	C.R.	P
X1.1	←	X1	1.000			
X1.2	←	X1	.951	.111	8.549	***
X1.3	←	X1	.840	.098	8.580	***
X2.1	←	X2	1.000			***
X2.2	←	X2	.910	.165	5.520	***
X2.3	←	X2	1.008	.154	6.563	***
X2.4	←	X2	.996	.167	5.954	***
X3.1	←	X3	1.000			
X3.2	←	X3	.896	.123	7.307	***
X3.3	←	X3	.964	.140	6.906	***
X3.4	←	X3	.924	.120	7.724	***
X4.1	←	X4	1.000			
X4.2	←	X4	1.035	.151	6.869	***
X4.3	←	X4	.980	.161	6.097	***
X4.4	←	X4	1.021	.162	6.290	***
X4.5	←	X4	.779	.146	5.337	
X4.6	←	X4	.866	.123	7.068	***
Y1.1	←	Y1	1.000			***
Y1.2	←	Y1	1.102	.190	5.814	***
Y1.3	←	Y1	1.164	.194	5.995	***
Y1.4	←	Y1	1.045	.221	4.731	***
Y2.1	←	Y2	1.000			
Y2.2	←	Y2	1.182	.173	6.826	***
Y2.3	←	Y2	1.226	.164	7.481	***
Y2.4	←	Y2	1.216	.168	7.253	***
Y3.1	←	Y3	1.000			
Y3.2	←	Y3	1.106	.116	9.495	***
Y3.3	←	Y3	1.009	.102	9.863	***
Y3.4	←	Y3	1.013	.088	11.569	***
Y3.5	←	Y3	1.150	.108	10.654	***

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The convergent validity test results from the table 4 showed that all indicators utilized possessed a Critical Ratio (t_{score}) value greater than its t_{table} with a significance level $t_{score} > 1.697$. Based on a significance level of 0.05 and degrees of freedom (df) = 30 (total number of indicators). This proves that each item validly represents its respective construct. Construct Reliability (CR) was calculated using the formula (1).

$$CR = \frac{(\text{Std.Loading})^2}{(\text{Std.Loading})^2 + \sum \varepsilon_j} \quad (1)$$

In this formula, Std. Loading represents the standardized factor loadings of the indicators, while ε_j denotes the error variances associated with each indicator. The results of the construct reliability calculations are presented in table 5.

Table 7. Construct Reliability for Measurement Model

			Estimated Standardized Regression Weight	Error	Construct Reliability
X1.1	←	X1	.872	0.128	
X1.2	←	X1	.646	0.354	0.852
X1.3	←	X1	.660	0.34	
X2.1	←	X2	.547	0.453	
X2.2	←	X2	.544	0.456	0.797
X2.3	←	X2	.739	0.261	
X2.4	←	X2	.631	0.369	
X3.1	←	X3	.651	0.349	
X3.2	←	X3	.633	0.367	0.843
X3.3	←	X3	.633	0.367	
X3.4	←	X3	.755	0.245	
X4.1	←	X4	.636	0.364	
X4.2	←	X4	.670	0.33	
X4.3	←	X4	.569	0.431	0.847
X4.4	←	X4	.606	0.394	
X4.5	←	X4	.461	0.539	
X4.6	←	X4	.685	0.315	
Y1.1	←	Y1	.562	0.438	
Y1.2	←	Y1	.654	0.346	0.772
Y1.3	←	Y1	.650	0.35	
Y1.4	←	Y1	.491	0.509	
Y2.1	←	Y2	.579	0.421	
Y2.2	←	Y2	.647	0.353	0.846
Y2.3	←	Y2	.749	0.251	
Y2.4	←	Y2	.713	0.287	
Y3.1	←	Y3	.746	0.254	
Y3.2	←	Y3	.717	0.283	
Y3.3	←	Y3	.744	0.256	0.928
Y3.4	←	Y3	.844	0.156	
Y3.5	←	Y3	.795	0.205	

Table 5 presents the construct reliability for the measurement model, showing the estimated standardized regression weights and error values for each indicator within their respective constructs. Each construct, labeled from X1 to Y3, consists of multiple indicators with varying regression weights, reflecting their strength in representing the underlying construct. The construct reliability values range from 0.772 to 0.928, indicating good internal consistency across all constructs. Higher regression weights suggest stronger indicators, while the error values represent the measurement uncertainty for each item. Overall, the table confirms that the measurement instrument demonstrates satisfactory reliability, making it suitable for further analysis.

E. Structural Model

The structural model tested in this study is shown in figure 3. It depicts the relationships between the latent variables (X1 to X4 as exogenous variables and Y1 to Y3 as endogenous variables) along with their observed indicators. The

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model's goodness of fit indices are also presented, indicating an acceptable fit between the hypothesized model and the observed data.

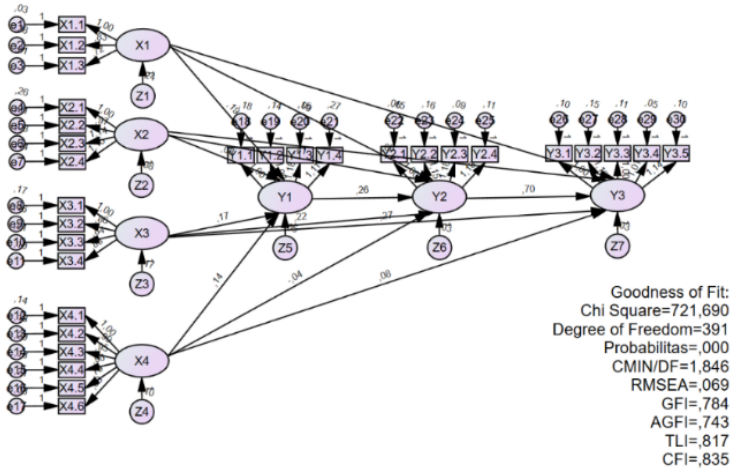

Figure 3. Structural Model of Purchase decision, Brand loyalty, dan Repurchase intention BW X in Surabaya

The initial evaluation of the structural model indicated that the empirical data did not perfectly fit the hypothesized model. The initial Goodness of Fit tests yielded a significant Chi-Square value of 721.690 and marginal comparative fit indices (GFI = 0.784, AGFI = 0.743, TLI = 0.817 and CFI = 0.835). Although the CMIN/DF and RMSEA were within acceptable limits the overall results necessitated model refinement.

An examination of the Modification Indices (M.I.) revealed significant redundancies among several error terms, most notably a high index value (33.590) between error variable. To resolve these misspecifications and improve model fit without violating theoretical assumptions, a model modification was executed by correlating the error terms exhibiting the M.I. values. This targeted modification effectively reduced the Chi-square value, subsequently elevating the comparative indices and further minimizing the RMSEA.

F. Modification Model

This modified model is the result of refining the initial model to improve the fit between the model and the empirical data. Figure 4 illustrates the structural relationships among purchase decision, brand loyalty, and repurchase intention for BW X in Surabaya.

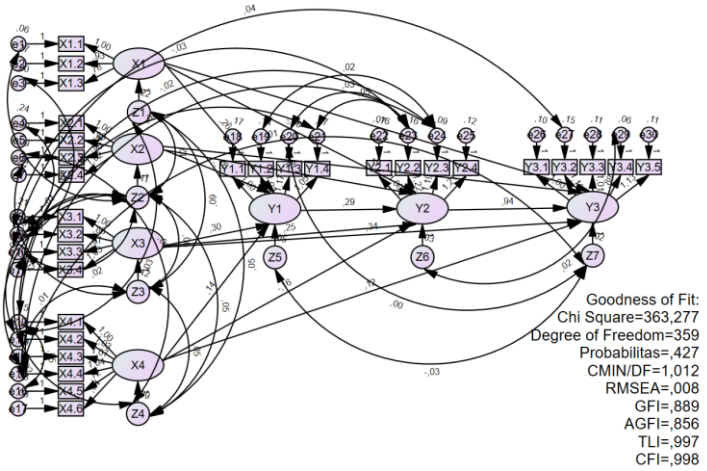

Figure 4. Modification Model of Purchase decision, Brand loyalty, dan Repurchase intention BW X in Surabaya

The initial evaluation of the structural model indicated that the empirical data did not fully fit the conceptual model. necessitating model modification. Based on the Modification Indices (M.I.) guidelines, the modification focused on correlating error terms that exhibited high redundancy without violating theoretical assumptions. Following the modification, the final model demonstrated a highly significant and ideal Goodness of Fit. The probability value improved to 0.359 (> 0.05) accompanied by a Chi-Square value of 363.277 (df = 359). Other primary fit indicators were perfectly met: CMIN/DF stood at 1.012 (≤ 2.00) and RMSEA reached a remarkably minimal error rate of 0.008 (≤ 0.08). Although GFI (0.889) and AGFI (0.856) remained at marginal levels, major comparative indices such as TLI

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(0.997) and CFI (0.998) exceeded the excellence threshold (≥ 0.95). To provide further insight, the table 6 presents the Standardized Regression Weight for the modification model.

Table 8. Standardized Regression Weight for Modification Model

			Estimate	C.R.	P	ESRW
Y1	←	X1	.257	1.818	.069	.415
Y1	←	X2	-.153	-.589	.556	-.173
Y1	←	X3	.304	2.269	.023	.372
Y2	←	X1	.145	1.081	.280	.150
Y2	←	X2	-.034	-.306	.759	-.055
Y2	←	X3	.481	2.313	.021	.547
Y2	←	X4	.253	2.226	.026	.311
Y2	←	Y1	-.160	-1.358	.174	-.167
Y3	←	X1	.290	2.355	.019	.292
Y3	←	X2	.072	.693	.488	.092
Y3	←	X3	-.186	-.832	.405	-.166
Y3	←	X4	.336	2.677	.007	.325
Y3	←	Y2	.122	1.059	.290	.100

According to the Standardized Regression Weight table for the modification model presented in table 6, following the confirmation of the model's fit, the evaluation proceeds to assess the validity and significance of the causal relationships within this final structural model. The estimation results, as presented in the structural regression weights table, utilize the Critical Ratio (C.R.) and Probability (P) values to determine the significance of each specific path. A structural path is considered statistically valid and significant if the absolute C.R. value exceeds 1.697 which ($t_{value} > t_{table}$). Based on the output, several pathways demonstrate robust statistical significance, notably those exhibiting C.R. values of 2.269 (p = 0.023), 2.313 (p = 0.021), 2.226 (p = 0.026), 2.355 (p = 0.019), and 2.677 (p = 0.007). Additionally. one path shows a C.R. of 1.818 (p = 0.069). Conversely, paths possessing C.R. values below the acceptable threshold above the 1.697 limit, fail to meet the significance criteria. The relationships defined by these particular paths are therefore deemed statistically insignificant. The distribution of these valid and invalid parameters, alongside their Estimated Standardized Regression Weights (ESRW), serves as the definitive groundwork for concluding the simultaneous equations and the subsequent hypothesis testing.

G. Structural Equations (Simultaneous Equations)

Following the attainment of an optimal structural model fit, the simultaneous equations were formulated to mathematically represent the causal relationships among the latent variables. These equations utilize the standardized regression weights to illustrate the magnitude and direction of the effects from the exogenous variables (Brand Image, Brand Awareness, Price, Promotion) to the endogenous variables (Purchase Decision, Brand Loyalty, Repurchase Intention). The formulated structural equations for the BW X brand are:

1. Equation 1: Purchase Decision

$Y_1 = f(X_1) + f(X_2) + f(X_3) + f(X_4)$
$Y_1 = 0.415\ X_1 - 0.173\ X_2 + 0.372\ X_3 + 0.150\ X_4$

The equation indicates that Purchase Decision is positively and predominantly influenced by Brand Image (X_1) with a coefficient of 0.415. followed closely by Price (X_3) at 0.372. Conversely, Brand Awareness (X_2) displays a negative coefficient of -0.173. while Promotion (X_4) contributes weakly but positively with a coefficient of 0.150.

2. Equation 2: Brand Loyalty

$Y_2 = ff(Y_1) + f(X_1) + f(X_2) + f(X_3) + f(X_4)$
$Y_2 = 0.292\ (0.415\ X_1 - 0.173\ X_2 + 0.372\ X_3 + 0.150\ X_4)\ -0.055X_1 + 0.547X_2 + 0.311X_3 - 0.167X_4$
$Y_2 = 0.121X_1 - 0.051\ X_2 + 0.109\ X_3 + 0.044X_4 - 0.055X_1 + 0.547X_2 + 0.311X_3 - 0.167X_4$
$Y_2 = 0.066X_1 + 0.496X_2 + 0.420X_3 - 0.123X_4$

This equation shows that Brand Loyalty is highly influenced by Brand Awareness (X_2) with the largest coefficient of 0.547, followed by Price (X_3) at 0.311. In contrast, Brand Image (X_1) and Promotion (X_4) exhibit negative structural paths with coefficient of -0.055 and -0.167, diminishing their roles in building long-term loyalty.

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3. Equation 3: Repurchase Intention

Y_3= fff (Y_2) + f(X_1) + f (X_2) + f (X_3) + f (X_4)
Y_3= 0.737 (0.292 (0.415 X_1 − 0.173 X_2 + 0.372 X_3 + 0.150 X_4) -0.055X_1 + 0.547X_2 + 0.311X_3 - 0.167X_4) − 0.092X_1 − 0.166X_2 + 0.325X_3 + 0.100X_4
Y_3= 0.737 (0.066X_1 - 0.598X_2 + 0.420X_3 − 0.123X_4) − 0.092X_1 − 0.166X_2 + 0.325X_3 + 0.100X_4
Y_3= 0.049X_1 - 0.366X_2 + 0.309X_3 − 0.091X_4 − 0.092X_1 − 0.166X_2 + 0.325X_3 + 0.100X_4
Y_3= − 0.043X_1 + 0.200X_2 + 0.634X_3 + 0.009X_4

The final equation reveals that Repurchase Intention is Price (X_3) emerges as the most dominant and robust predictor, contributing a massive coefficient of 0.634, followed by Brand Awareness (X_2) at 0.200. Brand Image (X_1) has a small negative effect with a coefficient of -0.043, while Promotion (X_4) shows a very minor positive influence with a coefficient of 0.009.

H. Hypotheses Testing

Prior to detailing the structural relationships, a summary of the hypothesis testing results based on the modification model is presented in Table 7. The evaluation compares the Critical Ratio (C.R.) against the (t_{table} = 1.697). The table below systematically presents the detailed outcomes of the hypothesis testing, including the critical ratios and their comparison against the established significance threshold.

Table 9. Hypothesises Results

Hypotheses	Relationship	t_{score}	t_{table}	Decision
H_1	Brand Image → Purchase Decision	.415	1.697	Supported
H_2	Brand Awareness → Purchase Decision	-.173	1.697	Not Supported
H_3	Price → Purchase Decision	.372	1.697	Supported
H_4	Promotion → Purchase Decision	.150	1.697	Not Supported
H_5	Brand Image → Brand Loyalty	-.055	1.697	Not Supported
H_6	Brand Awareness → Brand Loyalty	.547	1.697	Supported
H_7	Price → Brand Loyalty	.311	1.697	Supported
H_8	Promotion → Brand Loyalty	-.167	1.697	Not Supported
H_9	Brand Image → Repurchase Intention	.292	1.697	Not Supported
H_{10}	Brand Awareness → Repurchase Intention	.092	1.697	Not Supported
H_{11}	Price → Repurchase Intention	-.166	1.697	Supported
H_{12}	Promotion → Repurchase Intention	.325	1.697	Not Supported
H_{13}	Purchase Decision → Brand Loyalty	.100	1.697	Supported
H_{14}	Brand Loyalty → Repurchase Intention	.737	1.697	Supported

The modification structural estimation reveals that Brand Image has a positive and significant effect on Purchase Decision. Similarly, Price serves as a strong and significant driver. Thus, H1 and H3 are supported. Conversely. Brand Awareness and Promotion do not yield significant impacts, meaning H2 and H4 are rejected. This indicates that for consumers of BW X in Surabaya, a positive brand reputation and competitive pricing align better with their immediate purchasing parameters than promotional exposure or basic brand recognition.

In shaping consumer loyalty, Brand Awareness inversely acts as a highly significant positive predictor, supported by favorable Price perceptions. Furthermore, the prior Purchase Decision significantly reinforces Brand Loyalty. Consequently, H6, H7, and H13 are supported. In contrast, Brand Image and Promotion fail to significantly influence loyalty, rejecting H5 and H8. This proves that long-term loyalty for BW X is built upon deep-rooted brand familiarity (awareness), sustained price satisfaction, and the success of the initial buying experience, rather than superficial promotional cuts.

Testing the direct effects on Repurchase Intention shows that Price is the sole external factor exerting a significant direct influence, thereby supporting H11. The other external variables Brand Image, Brand Awareness, and Promotion, do not reach significance, rejecting H9, H10, and H12. Most importantly, the structural model successfully validates a crucial progression: Brand Loyalty acts as the strongest and most significant predictor of Repurchase Intention, firmly supporting H14. This highlights that cultivating profound brand loyalty is the most vital mechanism to guarantee continuous consumption and positive post-purchase behavior for BW X.

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I. Discussion

The structural estimation results provide a comprehensive map of consumer behavior for BW X in Surabaya. While several hypotheses were supported, the emergence of non-significant results in certain pathways offers a critical point for analytical discussion, particularly considering the brand's current status as a new player facing a reputation crisis.

1. The Drivers of Purchase Decision

The findings reveal that Brand Image (H1) and Price (H3) are the primary drivers of purchase decisions, whereas Brand Awareness (H2) is not. Viewed through the CBBE framework, this confirms that for BW X brand meaning (image) is far more critical than mere brand salience (awareness). Consumers in Surabaya do not purchase simply because they "know" the brand; rather, they evaluate the competence of the parent FMCG company behind BW X as a guarantee of quality. This suggests that a positive image serves as a vital defense mechanism against perceived risks. Furthermore, the insignificance of Promotion (H4) indicates that in a saturated urban AMDK market, aggressive discount strategies or advertisements lose their efficacy if not accompanied by strong brand trust. This supports the findings of [10], which state that pragmatic factors such as price and image are more decisive in the bottled water industry than momentary promotional stimuli.

2. Transformation of Experience to Brand Loyalty

In alignment with the CBBE hierarchy, loyalty or brand resonance represents the pinnacle of the consumer experience. The significance of Purchase Decision (H13) and Price (H7) toward loyalty underscores that post-purchase satisfaction and consistent economic value are fundamental prerequisites for loyalty. Interestingly, Brand Awareness (H6), which did not influence the initial purchase, emerged as a significant predictor of loyalty. This indicates that brand awareness plays a "long-game" role; once a consumer tries the product, familiarity with the brand's presence becomes a psychological anchor that prevents brand switching. Conversely, the failure of Brand Image (H5) and Promotion (H8) to directly influence loyalty proves that loyalty for BW X in Surabaya is "performance-based." While image may attract consumers to try the product (H1), only product quality and price stability can keep them loyal. Promotion is shown to be merely transactional and incapable of fostering long-term emotional commitment [24].

3. Formation of Repurchase Intention

Through the lens of the Theory of Planned Behavior (TPB), repurchase intention is understood as a behavioral intention governed by attitudes and perceived behavioral control. The finding that Brand Loyalty (H14) is the strongest predictor of repurchase intention confirms that loyalty has been deeply internalized as a positive attitude. Loyal consumers automatically intend to consume BW X again without needing to re-evaluate the brand at every purchase occasion. However, the direct significance of Price (H11) on repurchase intention indicates the presence of perceived behavioral control. Even when consumers feel loyal, financial control (price rationality) remains a determinant of whether that intention will be realized. Meanwhile, the insignificance of Brand Image (H9) and Brand Awareness (H10) toward repurchase intention reinforces the role of Loyalty as a full mediator. Elements of brand equity must first undergo the process of loyalty formation before they can trigger long-term behavioral intentions [8].

4. Novelty and practical Implication

The novelty of this research lies in uncovering consumer behavior patterns toward a new brand facing a reputation crisis. This study proves that brand image serves as the "entry ticket" to the market, while brand awareness and price stability act as the "retention tools." For BW X management, these results suggest a strategic shift: rather than allocating excessive budgets to mass promotions (which proved insignificant for loyalty), it is more effective to focus on stabilizing brand trust through quality communication and maintaining price competitiveness at the retail level to secure long-term repurchase cycles.

Conclusions

Based on the structural model testing of BW X consumer behavior in Surabaya, this study draws several key conclusions regarding the dynamics of consumer decision-making. Initially, during the purchase decision stage, consumers are significantly influenced by Brand Image and Price. They prioritize the product's reputation and the alignment of price with the benefits received, whereas mere Brand Awareness or exposure to Promotion is insufficient to trigger an initial purchase. As consumers transition towards building Brand Loyalty, the determining factors shift. Brand Awareness and Price stability emerge as the primary drivers, supported by the positive experience from their previous purchase decision. Conversely, promotional strategies relying heavily on discounts indicate a negative impact on the formation of long-term loyalty, confirming the occurrence of spurious loyalty where consumers easily switch brands once the promotional period ends. Ultimately, in achieving Repurchase Intention, Price stands as the only external stimulus with a significant direct effect. However, the most crucial finding of this structural modeling is that Brand Loyalty acts as the absolute and dominant mediator. Consumers exhibit high repurchase intentions only when they have passed through a satisfactory purchase decision phase and have established genuine loyalty to the BW X brand.

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References

1. D. S. T. Manalu, J. Nduru, A. N. Ahdy, N. S. Faizaty, R. A. Setiawan, and T. Azalia, "Analisis Preferensi Konsumen terhadap Produk Air Mineral Frozen di Prima Freshmart Sekolah Vokasi IPB," *Jurnal Ilmiah Nusantara*, vol. 1, no. 3, pp. 1–11, 2024, doi: 10.61722/jinu.v1i3.1496.
2. Badan Pusat Statistik, "Distribusi Persentase Rumah Tangga Menurut Kabupaten/Kota dan Sumber Air Minum di Provinsi Jawa Timur, 2023," 2023. [Online]. Available: https://jatim.bps.go.id/id/statistics-table/3/YzBaMlduSlFVbTVrUnpWeU9YRTJkaopVTTFkU1FUMDkjMyMzNTAw/distribusi-persentase-rumah-tangga-menurut-kabupaten-kota-dan-sumber-air-minum-di-provinsi-jawa-timur.html?year=2023
3. Joniwarta, W. Priatna, A. R. Hamdani, and A. D. Alexander, "Implementasi Fuzzy Logic pada Sistem Kontrol pH Air Mineral Berbasis IoT," *Indonesian Journal of Computer Science*, vol. 12, no. 4, pp. 2064–2077, 2023, doi: 10.33022/ijcs.v12i4.3356.
4. M. N. Ihsan and B. Sutedjo, "Pengaruh *Brand Image* dan *Brand Trust* terhadap Kepuasan Konsumen dan Dampaknya terhadap Minat Beli Ulang," *Forum Ekonomi*, vol. 24, no. 1, pp. 170–176, 2022, doi: 10.30872/jfor.v24i1.10586.
5. M. D. Setiawan, "Pengaruh Kualitas, Harga, dan Promosi Produk terhadap Keputusan Pembelian Air Mineral Dalam Kemasan (AMDK) Merek Aqua," *Jurnal CAFE*, vol. 3, no. 2, pp. 29–37, 2022, doi: 10.51742/akuntansi.v3i2.613.
6. M. P. Putra and S. Purwanto, "The Influence of Brand Image and Brand Awareness on Brand Loyalty in Packaged Drinking Water Ades in Surabaya City," *Jurnal Ekonomi dan Bisnis Digital*, vol. 2, no. 4, pp. 1137–1146, 2023, doi: 10.55927/ministal.v2i4.5899.
7. H. D. Putra, D. Himawati, D. Suzana, and D. M. Oktavilantika, "The Influence of Social Media Marketing, e-WOM, Brand Awareness, and Brand Image on Brand Loyalty of Herbs Product," *Almana: Jurnal Manajemen dan Bisnis*, vol. 7, no. 1, pp. 77–83, 2023, doi: 10.36555/almana.v7i1.2105.
8. R. P. Aggarini and S. K. Prastiwi, "The Influence of Green Marketing, Lifestyle, and Brand Image on Repurchase Intention," *Global Review of Economics and Business Strategy*, vol. 1, no. 1, pp. 57–70, 2025, doi: 10.34013/jk.v8i1.1410.
9. L. Fransisca, S. Thomas, Andi, and R. Putra, "Analysis of the Effect of Price, Advertising, and Brand Image on Purchasing Decisions of Aqua in Pekanbaru City," *Lucrum: Jurnal Bisnis Terapan*, vol. 4, no. 2, pp. 222–234, 2024, doi: 10.33369/bicemba.2.2024.62.
10. R. S., A. R. Mus, H. Damis, and A. Mahmud, "The Intervening of Purchase Decision Between Marketing Mix, Consumer Behaviour and Brand Image on Customer Satisfaction," *Jurnal Manajemen Bisnis*, vol. 8, no. 2, pp. 382–396, 2021, doi: 10.33096/jmb.v8i2.925.
11. F. Herman, R. Indra, Kurniawati, M. Christiawan, and M. Aras, "Factors Influencing Brand Image and Purchase Intention in Indonesia's Furniture Distribution Channels," *Journal of Distribution Science*, vol. 22, no. 7, pp. 33–42, 2024, doi: 10.15722/jds.22.07.2024.07.33.
12. D. Octavia, R. Arifin, and M. K. A. B. Suharto, "Pengaruh Brand Awareness, Brand Image, Kualitas Produk, Harga, dan Promosi terhadap Keputusan Pembelian Air Minum Dalam Kemasan (AMDK) Merek AQUA," *e-Jurnal Riset Manajemen*, vol. 11, no. 23, pp. 10–27, 2022. [Online]. Available: https://jim.unisma.ac.id/index.php/jrm/article/view/30096/22761
13. M. Waluyo and M. Rachman, *Mudah Cepat Tepat dalam Aplikasi Structural Equation Modeling*, 2nd ed. Malang, Indonesia: PT Literasi Nusantara Abadi Group, 2024.
14. Liyono, "Pengaruh Brand Image, Electronic Word of Mouth (E-WOM), dan Harga terhadap Keputusan Pembelian Produk Air Minum Galon Crystalline pada PT Pancaran Kasih Abadi," *Jurnal Ekonomi, Manajemen dan Bisnis*, vol. 3, no. 1, pp. 73–91, 2022, doi: 10.32815/jubis.v3i1.1089.
15. Pandiangan, M. Masiyono, and Y. D. Atmogo, "Faktor-Faktor yang Mempengaruhi Brand Equity: Brand Trust, Brand Image, Perceived Quality, & Brand Loyalty," *Jurnal Ilmu Manajemen Terapan*, vol. 2, no. 4, pp. 471–484, 2021, doi: 10.31933/jimt.v2i4.459.
16. N. Arianty and A. Andira, "Pengaruh Brand Image dan Brand Awareness terhadap Keputusan Pembelian," *Maneggio: Jurnal Ilmiah Magister Manajemen*, vol. 4, no. 1, pp. 39–50, 2021, doi: 10.30596/maneggio.v4i1.6766.
17. C. Clarissa and I. Bernarto, "The Influence of Brand Ambassador, Brand Awareness, Brand Image and Prices on Purchase Decisions on Online Marketplace," *Business and Entrepreneurial Review*, vol. 22, no. 2, pp. 273–288, 2022, doi: 10.25105/ber.v22i2.14966.
18. D. Darmawan and S. Arifin, "The Study Empiris tentang Perilaku Konsumen Produk Air Minum dalam Kemasan Ditinjau dari Variabel Harga dan Kesadaran Merek," *Ideas: Jurnal Pendidikan, Sosial, dan Budaya*, vol. 7, no. 3, p. 179, 2021, doi: 10.32884/ideas.v7i3.434.
19. E. M. Dilasari, G. Yosita, and V. F. Sanjaya, "Pengaruh Cita Rasa dan Promosi Melalui Media Sosial terhadap Keputusan Pembelian Konsumen Kopi Janji Jiwa Bandar Lampung," *REVENUE: Jurnal Manajemen Bisnis Islam*, vol. 3, no. 1, pp. 25–42, 2022, doi: 10.24042/revenue.v3i1.10448.
20. M. G. Maulana and W. Gunadi, "Pengaruh Promosi dan Kualitas Pelayanan terhadap Keputusan Pembelian Online di Tokopedia Wilayah DKI Jakarta," *JIMEN: Jurnal Inovasi Mahasiswa Manajemen*, vol. 3, no. 2, pp. 183–197, 2023. [Online]. Available: https://jom.unsurya.ac.id/index.php/jimen/article/view/119/339

21. Nurdiansah and Widyastuti, "Pengaruh *Price Discount* terhadap *Customer Satisfaction* dan *Repurchase Intention* (Studi pada Pengguna Shopee Food)," *SIBATIK: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, dan Pendidikan*, vol. 1, no. 8, pp. 1495–1514, 2022, doi: 10.54443/sibatik.v1i8.198.
22. S. Romadon, M. A. Pramusinto, and S. N. Kamelia, "Pengaruh Kualitas Produk, Citra Merek, dan Harga terhadap Keputusan Pembelian melalui Shopee," *Solusi*, vol. 21, no. 3, pp. 259–269, 2023, doi: 10.26623/slsi.v21i3.7080.
23. R. Simangunsong and Morina, "Pengaruh Promosi, Harga, dan Kepercayaan terhadap Keputusan Pembelian di E-Commerce Shopee pada Mahasiswa Universitas HKBP Nommensen Medan," *Jurnal Ilmu Sosial dan Politik*, vol. 1, no. 2, pp. 131–149, 2021, doi: 10.51622/jispol.v1i2.413.
24. A. Annisawati and A. Situmeang, "Pengaruh Harga dan Brand Experience terhadap Brand Loyalty pada Produk Teh Celup Walini PT Perkebunan Nusantara VIII Bandung," *Jurnal Bisnis dan Pemasaran*, vol. 12, no. 1, 2022. [Online]. Available: https://ejurnal.ulbi.ac.id/index.php/promark/article/view/2131/951
25. Q. Taslim, Faizatun, and I. H. Hatta, "Pengaruh Brand Image dan Brand Attachment terhadap Brand Loyalty dengan Variabel Intervening Keputusan Pembelian (Studi pada Pelanggan Apotek SB)," *COSTING: Journal of Economic, Business and Accounting*, vol. 7, no. 6, pp. 6408–6420, 2024, doi: 10.31539/costing.v7i6.13183.
26. Tataningtyas and E. Tjahjaningsih, "Faktor yang Mempengaruhi E-Trust serta Dampaknya pada Repurchase Intention," *E-Bisnis: Jurnal Ilmiah Ekonomi dan Bisnis*, vol. 15, no. 1, pp. 55–67, 2022, doi: 10.51903/e-bisnis.v15i1.616.
27. F. Yusuf, R. Badi'ah, and A. F. Dedyansyah, "Meningkatkan Repurchase Intention melalui Keamanan dan Kepuasan Konsumen: Studi Kasus Marketplace di Indonesia," *JEBDEKER: Jurnal Ekonomi, Manajemen, Akuntansi, Bisnis Digital, Ekonomi Kreatif, dan Entrepreneurship*, vol. 4, no. 2, pp. 295–304, 2024, doi: 10.56456/jebdeker.v4i2.266.
28. Z. Putlely, Y. A. Lesnussa, A. Z. Wattimena, and M. Y. Matdoan, "Structural Equation Modeling (SEM) untuk Mengukur Pengaruh Pelayanan, Harga, dan Keselamatan terhadap Tingkat Kepuasan Pengguna Jasa Angkutan Umum Selama Pandemi COVID-19 di Kota Ambon," *Indonesian Journal of Applied Statistics*, vol. 4, no. 1, p. 1, 2021, doi: 10.13057/ijas.v4i1.45784.
29. S. Demir, "Comparison of Normality Tests in Terms of Sample Sizes under Different Skewness and Kurtosis Coefficients," *International Journal of Assessment Tools in Education*, vol. 9, no. 2, pp. 397–409, 2022, doi: 10.21449/ijate.1101295.

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