



Customer Loyalty Analysis with Markov Chain and Customer Bonding Strategy: Case Study at PT XYZ

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ABSTRACT

This study aims to analyze customer loyalty at PT XYZ is using the Markov Chain approach and Customer Bonding strategy. The research method combines quantitative analysis through Markov Chain to predict customer switching and qualitative analysis through questionnaires to measure the effectiveness of the Customer Bonding strategy. The results showed that the probability of customers staying was 54%, while the probability of moving to competitors was 46%. The Customer Bonding strategy, especially in the aspects of relationship bonding and advocacy bonding, has proven effective in increasing customer loyalty. The strategies that can be carried out so that XYZ Workshop does not experience a drastic decline in customers are by implementing strategies such as: Customer Retention Strategy, Improving Quality and Differentiation, Expanding Market Access, and Reanalyzing Business Models. However, the availability of spare parts and product design are still weaknesses that need to be improved. This study provides practical implications for companies in designing more effective customer retention strategies.

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1. INTRODUCTION

Globalization is unavoidably accompanied by change, and these changes have an effect on business competition. As a result, organizations must act and behave swiftly to compete in a dynamic and uncertain economic environment. Consequently, in order to establish and preserve client loyalty, every business must engage in competitive competition (Menggelea Et Al., 2020). By understanding customer needs that align with their interests, companies can adopt

strategies as a way to compete (Dewi, Gustya, 2022). To retain customers and attract more potential customers, a business must improve its service and product quality. A business that is serious about serving consumers and marketing will definitely succeed. Customer service is important for a business's development. Improving the quality of service to consumers will make consumers feel satisfied because their needs and tastes are met. (Febrianti & Beni, 2023).

Customer loyalty is a critical factor in the automotive industry, especially amidst increasingly fierce competition. PT XYZ, as one of the leading Yamaha dealers in Indonesia, faces challenges in maintaining customer loyalty, as indicated by the fluctuation in the number of customers in the period from January to June 2024.

Table 1. Customer data at PT XYZ January-June 2024

Month	Amount
Januari	849
Februari	858
Maret	809
April	832
Mei	821
Juni	775
Total	4944

Based on the Table 1, the significant decrease in customers in June 2024 is an indication of the need for a more effective strategy to retain customers. This study integrates two main approaches, namely Markov Chain to model customer behavior and Customer Bonding as a retention strategy. Markov Chain is used to analyze customer switching patterns and predict future customer tendencies, while Customer Bonding is used to identify strategies that can strengthen the relationship between the company and customers. The combination of these two approaches is expected to provide a comprehensive solution for increasing customer loyalty.

2. LITERATURE REVIEW

Customer Loyalty Concept

Research on customer loyalty has been conducted in a number of marketing domains. According to Oliver (1999), a customer's dedication to continuously making repeat purchases of a brand or product is known as loyalty. Customer experience, after-sales care, and product quality are some of the major elements that affect customer loyalty in the automotive sector (Kotler & Keller, 2016). Customer loyalty is a strong desire to buy and support a product or service in the future, even though there is a possibility that the customer will abandon the product or service due to situational factors and marketing efforts (Safitri & Kurniawati, 2024). Recent research by Sashi (2020) identified that customer loyalty in the automotive industry develops through three

stages: (1) cognitive loyalty based on product information, (2) affective loyalty involving positive emotions, and (3) conative loyalty in the form of repurchase intentions.

Markov Chains in Customer Behavior Analysis

A technique called Markov Chain Analysis examines a variable's current characteristics based on its historical characteristics in order to forecast its future characteristics (Sulung Et Al., 2024). Markov Chain Models have been widely used in marketing research to analyze customer switching. Markov chains methods are principally used for Brand Loyalty studies in marketing problems. The main and most effective method for estimating a product's future market share, particularly in an oligopolistic setting, and determining a product's level of brand loyalty is the Markov chains method (Mutiu & Dotun, 2015). According to F. A. Gifari Et Al (2022), Markov Chain is a stochastic model that useful for predicting customer switching between brands based on historical data. The application of Markov Chain in customer loyalty has been proven by Nurhidayati Et Al. (2023) who successfully analyzed consumer loyalty patterns of bottled mineral water products. The results of their study showed that this model is effective in identifying customer transition probabilities and predicting future market share.

Customer Bonding Strategy

Customer bonding refers to any marketing efforts that bind clients such that the product being offered or consumed is the only answer they require, preventing them from switching to other products (Huda, 2020). Customer Bonding is a strategic approach. This idea relates to the interactions that can foster a solid, long-lasting relationship between businesses and their clientele. Customer bonding can help strengthen customer loyalty and build a positive image that can bring benefits to the business (Efendi et al., 2023).

Customer Bonding can also be interpreted as a strategy that focuses on customer loyalty, the honest appearance of the company through certain media, and consumer experiences using products or services that meet or exceed expectations (Vitram et al., 2023). Wilson

(2019) identified five stages of Customer Bonding: (1) awareness, (2) identity, (3) relationship, (4) community, and (5) advocacy.

Research by Rachmawati and Fitriani (2023) at PT Pos Indonesia shows that relationship bonding and advocacy bonding are the most critical factors in building loyalty. This finding is reinforced by Gustini Et Al. (2022) who found that reward and recognition programs are important elements in relationship bonding.

3. RESEARCH METHOD

This study uses a mixed-methods method that combines quantitative and qualitative approaches (Hendrayadi et al., 2023). Quantitative data were obtained from customer records of PT XYZ during the period January to June 2024, with a total of 4,944 customers. This data was analyzed using Markov Chains, This method involves creating a transition matrix that describes the probability of customers moving from one level of loyalty to another, for example, from "loyal" to "not loyal" or vice versa. The transition matrix is calculated based on historical data, such as purchase history or frequency of customer interactions with the company.

Meanwhile, qualitative data were collected through questionnaires distributed to 90 respondents selected using the Slovin sampling technique with a margin of error of 10%. This questionnaire measures the effectiveness of the Customer Bonding strategy which includes five aspects: awareness bonding, identity bonding, relationship bonding, community bonding, and advocacy bonding. The questionnaire data were analyzed using validity and reliability tests with the help of SPSS 22 software (Rosita et al., 2021).

4. RESULT AND DISCUSSION

Data Collection

Data collection is the initial step before processing the data. This data collection consists of identifying the initial Customer variables, collecting additional Customer variables with questionnaire I, measuring variables, and collecting motorcycle product transfer data with questionnaire II.

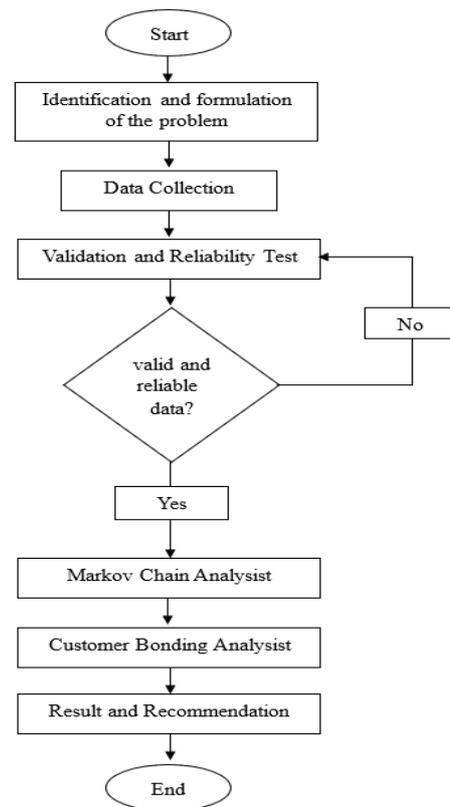


Figure 1. Research flow chart

Before distributing the questionnaire to respondents, all research tools used in this study were tested first to ensure that the instruments were valid and reliable. In this study, the Bivariate Pearson method (Pearson Product Moment Correlation) was used to measure the relationship between variables, namely independent variables (x) and dependent variables (y). In this research, the reliability test was conducted using Cronbach's Alpha. If a variable shows a Cronbach's Alpha value >0.60, it can be concluded that the variable can be said to be reliable or consistent in measuring.

Table 2. Respondents based on occupation

Profession	Amount
Private Employees	25
Self - Employed	28
State-Owned Enterprises	10
Government Employees	20
College Student	6
Policy	1
Total	90

These data show that the majority of respondents in this study have diverse employment backgrounds, with the largest proportion coming from self-employed and private employees.

Data Processing

Data processing is carried out by analyzing data, processing data using a transition probability matrix, calculating the Steady State and Customer probabilities for the future period based on the data obtained, and ranking based on predetermined criteria.

Data Analysis

The results of distributing the questionnaire to obtain data on Service Users currently used are as follows (Table 3).

Table 3. Number of customer transfers at PT XYZ

Origin of Workshop	XYZ	Other Workshops
XYZ	49	41

Based on the analyzed data, it was found that XYZ Workshop received 49 incoming vehicles, while Other Workshops received 41 incoming vehicles with a total of 90 vehicles.

Calculating Transition Probabilities

The transition probability of customer switching patterns carried out by respondents can be calculated using the formula:

$$P_{ij} = \frac{N_{ij}(t)}{N_i(t)}$$

Explanation:

$N_{ij}(t)$: Data on the transfer of brand i to j

$N_i(t)$: Number of previous users

Here is the calculation of the probability of customer switching in 2024 (Table 4).

Table 4. Consumer user migration patterns

Product	XYZ Workshop	Other Workshops
XYZ workshop	0.54	0.46

The data above shows the pattern of consumer usage shifts based on 2 types of workshops, The probability results for the XYZ workshop are 0.54, while for other workshops it is 0.46.

This calculation can be obtained using the transition probability formula.

Calculating Total Future Customer Churn and Stable Probability

Customer calculation in the n -th period, can use the formula:

$$C_n = C_{n-1} P, \text{ Where } n = 1, 2, \dots, m$$

Based on the results of the calculation of future customer transfers and stable probabilities, a recapitulation of the percentage of customers for the 2024 period and the coming period is obtained.

Table 5. Percentage of customers for the period 2025 and future period

Year	XYZ	Other Workshops	Total
2025	30%	21%	50%
2026	16%	9%	26%
2027	9%	4%	13%
2028	5%	2%	7%
2029	3%	1%	3%

Table 5 above is the result that total market share shows a downward trend, from 50% in 2025 to 1% in 2030, and remains stable at 1% in 2031. The stability of market share at a lower value indicates that the platform has undergone market adjustment, where consumers have moved to other, more competitive platforms. After this shifting process is complete, market share stabilizes because the platform still maintains a certain segment of loyal users, albeit in smaller numbers.

This system shows that in the long run, almost all customers eventually leave the workshop. This indicates a tendency for customers to gradually move away until eventually there are no customers left.

Customer Bonding Variable

The goal of customer bonding is to develop devoted and devoted clients for the business's goods and services (Tumbelaka, 2022). The Customer Bonding (X) variable is described into 5 indicators, namely Awareness Bonding, Brand Association, Perceived Quality, Brand Loyalty which are described into 15 statements.

The respondents' responses in the 5 indicators above are as follows:

1) Awareness Bonding

Table 6. Awareness bonding

Number	Question	Answer				
		SD	D	N	A	SA
1	The motorcycle dealer (as selected) has complete spare parts availability according to my needs.	16	14	16	29	15
2	Spare parts provided by motorbike dealers (as selected) are of good quality and durable.	15	14	15	29	16
3	The process of ordering and installing spare parts at the motorcycle dealer (as selected) is fast and efficient.	16	15	14	29	16
4	Motorcycle dealer staff (as selected) provide clear and accurate information regarding the spare parts needed.	15	15	15	30	15

Based on Table 6, the percentage of agree/strongly agree is lower (44-45%) compared to other dimensions, the percentage of disagree/strongly disagree is higher (30-31%), and the distribution of answers is more even in all categories.

Then, based on these results, it can be seen that consumer experience with dealers shows areas that need improvement, especially in the availability of spare parts, process efficiency, and clarity of information from staff.

2) Brand Association

Table 7. Brand association

Number	Question	Answer				
		SD	D	N	A	SA
1	The price of motorcycle spare parts (as selected) is affordable	15	15	15	29	16
2	Motorcycle spare parts (as selected) are made from safe materials.	16	15	15	29	15
3	The design of the motorcycle spare parts (as selected) is attractive.	16	15	15	33	11
4	Motorcycle spare parts (as selected) are easy to find at the nearest dealer or shop.	15	15	15	30	15

Based on Table 7. It can be seen that the percentage of agree/strongly agree is around 45-46%, the percentage of disagree/strongly disagree is around 30-31%, and for design, 44% agree/strongly agree. This shows that design has a higher percentage than other questions in this dimension.

Based on the results of the questionnaire obtained, it can be seen that consumers have a fairly positive association with the brand, especially in the design aspect which is considered attractive. However, there is still room for improvement in terms of price and product availability

3) Perceived Quality

Table 8. Perceived Quality

Number	Question	Answer				
		SD	D	N	A	SA
1	The branded spare parts (as I have chosen) meet my needs with good quality.	8	10	14	41	17
2	Branded spare parts (as selected) have many model variations to suit your needs.	9	12	13	43	13
3	The benefits of branded spare parts (as chosen) that I feel are in accordance with what is promised in the advertisement.	10	11	14	42	13
4	Spare parts of the brand (as selected) have better quality compared to other brands.	8	12	13	43	14

Based on Table 8, the majority of respondents, around 58-60%, agree or strongly agree with positive statements about the quality of spare parts, the highest percentage for "Agree" is around 41-43%, and the percentage of "Strongly Agree" ranges from 13-17%. It can be seen that questions 1 and 4 show a slightly

more positive perception of quality. So, from the results of the questionnaire obtained, it can be seen that consumers generally have a positive perception of the quality of this brand of spare parts, with the majority feeling that the product meets their needs and has good quality compared to other brands.

4) Brand Loyalty

Table 9. Brand loyalty

Number	Question	Answer				
		SD	TS	N	SD	SS
1	I will buy the same brand of spare parts (as selected) again in the future.	9	12	13	42	14
2	As long as I use branded spare parts (as selected), I am satisfied with the performance of these spare parts.	9	11	11	45	14
3	I will recommend the brand of spare parts (as selected) to others.	9	11	12	46	12

Based on Table 9, it can be seen that the highest percentage of agree/strongly agree among all dimensions (56-59%), 45-46% of respondents agree with performance satisfaction and recommendations, and only 12-14% strongly agree with repurchase intention and recommendations. From these results, it can be seen that, although brand loyalty is quite strong, with the majority of respondents stating repurchase intention and recommendations, the relatively low percentage of "strongly agree" indicates the potential to increase loyalty further.

After obtaining the questionnaire results from the respondents, it can be seen that the strongest dimensions are in Brand Loyalty and Perceived Quality, which shows the highest percentage of agree/strongly agree, around 56-60%. Furthermore, the weakest dimension is in Awareness Bonding (experience with dealers), which has the lowest percentage of agree/strongly agree (44-45%). Furthermore, related to consistency, Questions about product quality appear twice (in Perceived Quality and at the beginning of the data) with identical results, which shows the reliability of the questionnaire measurement.

The analysis results show that XYZ Workshop is experiencing a drastic loss of customers. To overcome this problem, here are some strategies that can be done:

1. Increase Consumer Loyalty
 - Develop loyalty programs to convert "agree" customers to "strongly agree" customers, such as discounts or memberships specifically for repeat customers.
 - Focus on more attractive after-sales services such as free maintenance or longer warranties.
2. Dealer Service Improvement
 - Provide training to staff so they can

provide clearer information.

- Increase the availability of spare parts.
 - Improved service efficiency and more complete work speed compared to other workshops.
3. Strengthening Brand Association
 - Leverage distribution expansion to increase product availability.
 - Improve communication about material safety.
 4. Advanced Analysis
 - Conduct statistical tests to see the relationship between dimensions.
 - Demographic analysis for further segmentation.
 - Test the significance of differences between dimensions.

5. CONCLUSION

Based on research that has been conducted, it can be seen that the probability of customers remaining in PT XYZ is 54%, while the probability of moving to competitors is 46%. Therefore, PT XYZ needs implement a well-planned retention strategy. Enhanced loyalty programs, such as discounts and memberships, can encourage customer retention. Service quality, especially after-sales services such as free maintenance, warranties, and fast response, must also be improved. A strong branding strategy is essential for building trust. Furthermore, spare parts distribution and availability need to be improved to avoid customer complaints. These steps are expected to increase customer satisfaction and loyalty.

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