

Analysis of Service Quality Improvement at PT XYZ through the Integration of the Kano Model, Markov Model, and the Push–Pull–Mooring Effect

Rangga Garnama^{1*}, Eko Rudi Cahyadi², Alim Setiawan³

^{1,2,3} Master of Management, Faculty of Economics and Management, IPB University, Indonesia

*Corresponding Author: ranggagarnama@apps.ipb.ac.id

Article History

Received: 06-07-2026

Revised: 16-07-2026

Published: 30-07-2026

Keywords: Service Quality, Kano Model, Markov Model, Push–Pull–Mooring Effect, Switching Intention, Customer Retention

ABSTRACT

Increasing competition in the pest control service industry requires companies to improve service quality while maintaining customer retention. This study aims to analyze service quality attributes, factors influencing switching intention, and their implications for customer retention at PT XYZ through the integration of the Kano Model, Push–Pull–Mooring (PPM) framework, and Markov Model. A quantitative approach was employed using survey data collected from 385 PT XYZ customers who had used the company's services for at least one year. The results indicate that PT XYZ's service attributes are classified into 21 Must-Be attributes, 11 One-Dimensional attributes, and 14 Attractive attributes. Attributes related to responsiveness, communication, work monitoring, and customer comfort were identified as having the greatest potential to enhance customer satisfaction. The PPM analysis shows that push effect is at a low level, pull effect is at a moderate level, while mooring effect is the most dominant factor in retaining customers. Consequently, customers' switching intention remains low. Furthermore, the Markov Model analysis indicates that PT XYZ has a customer retention probability of 71% and is projected to maintain a market share of 41.5% under steady-state conditions. The findings demonstrate that successful customer retention is determined not only by the fulfillment of basic service requirements but also by the company's ability to create added value, strengthen customer trust, and establish long-term relationships. The integration of the Kano Model, Push–Pull–Mooring framework, and Markov Model provides a comprehensive approach for developing sustainable service quality improvement and customer retention strategies in the pest control industry.

INTRODUCTION

Business-to-business (B2B) service industries are facing increasingly complex competitive dynamics as customer demands for service quality, cost efficiency, and operational reliability continue to rise. One of the strategic B2B service sectors is pest control

services, particularly for industrial, commercial, and office environments that require high standards of hygiene and safety. In this context, service quality serves not only to fulfill customers' operational needs but also as a critical determinant of long-term relationships between service providers and their clients.

Although B2B service relationships are generally contractual and long-term in nature, customer loyalty cannot be taken for granted. B2B customers tend to evaluate service providers rationally based on service consistency, responsiveness, and the alignment between price and perceived quality. When the delivered service fails to meet expectations, customers may begin considering alternative providers that offer superior value. This phenomenon suggests that customer switching intention may emerge even while contractual relationships remain in effect (Bansal et al., 2005).

Previous studies on service quality have primarily focused on measuring customer satisfaction and loyalty. The Kano Model has been widely employed to classify service attributes according to their effects on customer satisfaction and dissatisfaction, categorizing them into *must-be*, *one-dimensional*, and *attractive* attributes (Kano et al., 1984). This model provides valuable insights into which service attributes should be prioritized by organizations. However, the Kano Model does not explicitly explain how dissatisfaction with these service attributes contributes to customers' switching intentions.

In contrast, the *Push–Pull–Mooring* (PPM) framework explains customer switching intention through the interaction of *push factors* (service dissatisfaction), *pull factors* (the attractiveness of alternative service providers), and *mooring factors* (switching barriers that discourage customers from changing providers) (Bansal et al., 2005). Although the PPM framework effectively captures the psychological and behavioral mechanisms underlying switching intention, it does not explicitly identify the specific service attributes that constitute the primary sources of customer dissatisfaction.

Furthermore, most existing studies on *switching intention* adopt a static perspective by examining customer behavior at a single point in time. In practice, however, customer switching is a dynamic process that evolves over time. The Markov Model provides a quantitative approach for analyzing customer transition patterns among service providers and predicting the steady-state distribution of market share (Li, 2013). Nevertheless, the application of the Markov Model in B2B service contexts remains relatively limited and has rarely been integrated with service quality and customer switching intention analyses.

Based on these observations, a significant research gap exists, highlighting the need for an integrated approach to simultaneously examine service quality, customer switching intention, and customer transition dynamics. Therefore, this study integrates the Kano Model, the Markov Model, and the *Push–Pull–Mooring* framework to analyze service quality improvement in B2B service companies. This research contributes not only to the academic literature on service quality and customer switching behavior but also provides practical

managerial implications for B2B service firms in designing effective strategies for service quality improvement and customer retention.

RESEARCH METHOD

This study uses a quantitative approach with a survey method to analyze service quality and customer switching behavior in the B2B service industry. The research subjects were customers of a pest control company engaged in a contract-based service relationship. The unit of analysis in this study was B2B customers who had used the company's services for a specific period.

The study was conducted from March to September 2025. Data collection was conducted by distributing questionnaires to the company's active customers. The sampling technique used was purposive sampling, with respondents being B2B customers with experience using pest control services and involved in the evaluation or decision-making process related to the service.

The number of respondents collected in this study was 385. This number was deemed sufficient for further analysis, which requires moderate to large sample sizes to produce stable parameter estimates (Hair et al., 2019).

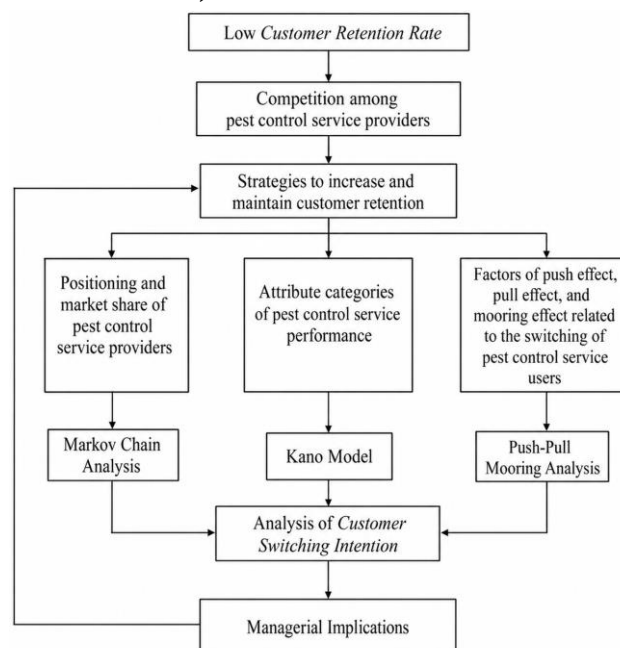


Figure 1. Conceptual Framework

Primary data was collected using a structured questionnaire developed based on a literature review and adapted to the context of the pest control service industry. The research instrument used a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to measure customer perceptions of service attributes, push factors, pull factors, and mooring factors, as well as switching intention. Before being widely used, the questionnaire underwent a content evaluation to ensure the clarity and relevance of the questions.

Data analysis was conducted in three main stages. The first stage was a Kano Model analysis to group service attributes into must-be, one-dimensional, and attractive categories. The grouping was based on a combination of functional and dysfunctional customer responses, in accordance with the approach proposed by Kano et al. (1984). The results of the Kano analysis were used to identify service attributes that should be prioritized for quality improvement.

The second stage was a Push–Pull–Mooring (PPM) analysis to describe the push effects, pull effects, mooring effects, and customer switching intention. The analysis was conducted descriptively using mean values and frequency distributions to determine the trends in customer perceptions of each construct.

The third stage was a Markov Model analysis to predict customer switching patterns between service providers and identify long-term steady-state market share conditions. The Markov Model was used to complement the PPM results with a dynamic perspective, providing insight into the long-term implications of customer switching intentions on market share distribution. The integration of these three methods allows the study to provide a comprehensive understanding of service quality, the mechanisms of customer switching intentions, and the dynamics of long-term customer switching in the B2B service context.

RESULT AND DISCUSSION

Kano Model Results

The analysis revealed 21 Must-Be attributes, 11 One-Dimensional attributes, and 14 Attractive attributes. Must-be attributes represent basic customer needs that must be met by service providers, and failure to meet these attributes will lead to significant dissatisfaction. In this study, the must-be attributes include indicators related to the reliability of pest control services, adherence to safety standards and work procedures, and consistency of service delivery according to the contract. These attributes are perceived as minimum prerequisites for pest control services.

Meanwhile, one-dimensional attributes demonstrate a linear relationship between service performance and customer satisfaction. Indicators included in this category include the speed and accuracy of responses to customer complaints, the competence and professionalism of field staff, and the appropriateness of price for the quality of service provided. The better a company's performance on these attributes, the higher the level of customer satisfaction, and conversely, a decline in performance will directly decrease satisfaction levels.

Furthermore, a small number of service attributes are classified as attractive. These attributes are generally associated with additional services that provide added value, such as providing more detailed pest control reports, proactive communication regarding pest prevention, or service innovations not explicitly expected by customers. The presence of attractive attributes can significantly increase customer satisfaction, but their absence does not directly lead to dissatisfaction.

Pull Effect

The average value of the pull effect indicator ranged from 2.89 to 2.98. These results indicate that some customers are starting to consider the attractiveness of competitors, particularly regarding company reputation, service modernity, and service quality.

Mooring Effect

The average value of the mooring effect indicator ranged from 3.47 to 3.59, the highest compared to other factors. This finding indicates that trust, comfort, and good working relationships are the main factors holding customers back from switching to other service providers.

Switching Intention

The average value of the switching intention indicator ranged from 2.00 to 2.16. These results indicate that PT XYZ customers have a low tendency to switch to other pest control service providers.

Markov Model Results

The Markov Model analysis results indicate that customer switching patterns between service providers tend to move toward a steady state in the long term. Despite customer switching from one period to the next, the market share distribution remains relatively stable if there are no significant changes in service quality.

This finding aligns with Li (2013), who stated that the Markov Model is effective in predicting long-term customer switching behavior. In the context of this research, the Markov results reinforce the findings of the PPM analysis, which showed low customer switching intention and strong mooring factors in retaining customers at PT XYZ.

Table 2. Future Period and Steady State Market Share

Pest Control Vendor	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
A	0.429	0.418	0.417	0.416	0.416	0.415	0.415	0.415
B	0.119	0.168	0.171	0.172	0.172	0.173	0.173	0.173
C	0.208	0.204	0.217	0.223	0.226	0.227	0.228	0.228
D	0.244	0.210	0.195	0.189	0.189	0.185	0.185	0.185

Managerial Implications

Based on the empirical analysis, the formulated managerial implications emphasize the integrated management of push, pull, and restraining factors that influence customer switching. The first strategy focuses on emphasizing push factors by improving the consistency and quality of core services, particularly attributes that fall into the must-be and one-dimensional categories. This approach is important because unmet core attributes have been shown to increase customer dissatisfaction and encourage switching intention.

The second strategy aims to reduce pull factors by strengthening PT XYZ's service differentiation compared to alternative service providers. Service differentiation focuses not

only on price but also on reputation, service reliability, and perceived customer value. This way, the attractiveness of competitors can be reduced even though customers have a wide choice of service providers.

Furthermore, the third strategy focuses on strengthening mooring factors by fostering long-term relationships and customer trust. Strengthening these restraining factors plays a crucial role in reducing switching intention, particularly in the context of contract-based services such as pest control. Overall, the implementation of this strategy is expected to reduce customer switching intention and support the stability of long-term relationships between PT XYZ and its customers.

CONCLUSION

Must-Be attributes contribute to suppressing the push effect by fulfilling basic customer needs. The PPM analysis results show a low level of push effect, indicating that customers do not experience significant dissatisfaction with PT XYZ's services. This finding aligns with the Kano Model results, which show the dominance of Must-Be attributes in aspects of work safety, equipment availability, adherence to procedures, punctuality, and quality of work. Fulfillment of these basic attributes means customers have no compelling reason to leave PT XYZ due to service dissatisfaction.

Furthermore, One-Dimensional attributes are related to the pull effect because customers tend to compare the performance of these attributes with other service providers. The PPM results show a moderate level of pull effect, indicating that some customers are beginning to consider the attractiveness of competitors, particularly regarding the company's reputation, service quality, and ability to provide better solutions. This finding is consistent with the characteristics of One-Dimensional attributes, which include work quality, work guarantees, communication skills, employee expertise, ease of access to management, and service quality. The better the performance of these attributes compared to competitors, the higher the level of customer satisfaction, while declining performance has the potential to increase customer interest in alternative service providers.

On the other hand, Attractive attributes contribute to a strong mooring effect. PPM results indicate that the mooring factor has the highest score compared to other factors, particularly in terms of comfort, trust, and working relationships with PT XYZ. This condition aligns with the Kano Model results, which identify Attractive attributes as aspects of speed of response to complaints, ability to provide solutions, effective communication, work monitoring, employee friendliness, and the ability to create a sense of comfort for customers. These attributes provide added value that exceeds basic customer expectations, strengthening emotional attachments, increasing trust, and forming long-term relationships that act as a deterrent to customer switching.

The integration of the Kano Model and PPM results indicates that the low switching intention of PT XYZ customers is not only due to low levels of dissatisfaction, but also to strong deterrent factors formed through positive service experiences. Customers are not only

satisfied with the basic service quality provided but also receive additional benefits that increase comfort and trust in the company. This condition results in customers being less inclined to search for or try other pest control service providers.

These findings are reinforced by the Markov Model results, which show that PT XYZ has the highest customer retention probability at 71% and a long-term (steady-state) market share of 41.5%. These results indicate that the majority of customers are projected to remain with PT XYZ's services in the long term. Thus, the Markov results provide quantitative support for the Kano and PPM findings, particularly regarding the strong mooring factor and low customer switching intention.

Overall, the integration of the Kano, Push-Pull-Mooring, and Markov Models indicates that PT XYZ's success in retaining customers is driven by a combination of the fulfillment of Must-Be attributes, which suppress dissatisfaction (push effect), the performance of One-Dimensional attributes, which limit the attractiveness of competitors (pull effect), and the dominance of Attractive attributes, which enhance comfort, trust, and long-term customer relationships (mooring effect). These conditions result in a low switching intention rate, supported by a high probability of customer retention based on the Markov analysis. Therefore, PT XYZ's customer retention strategy should be focused not only on fulfilling basic service attributes, but also on strengthening Attractive attributes that are able to create differentiation and sustainable added value for customers.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Bansal, H. S., Taylor, S. F., & James, Y. S. (2005). "Migrating" to new service providers: Toward a unifying framework of consumers' switching behaviors. *Journal of the Academy of Marketing Science*, 33(1), 96–115. <https://doi.org/10.1177/0092070304267928>
- Chang, Y. H., Wong, K. Y., & Fang, Y. H. (2020). Switching intention and switching behavior in service contexts: A Push-Pull-Mooring framework. *Journal of Service Theory and Practice*, 30(3), 1–23.
- Ejdys, J., & Gulc, A. (2020). Trust in courier services and its impact on customer satisfaction and loyalty. *Sustainability*, 12(3), 1–18. <https://doi.org/10.3390/su12030892>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2019). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications.
- Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive quality and must-be quality. *Journal of the Japanese Society for Quality Control*, 14(2), 39–48.
- Li, S. (2013). A Markov chain model for customer brand switching behavior. *Journal of Applied Statistics*, 40(1), 1–14.

- Violante, M. G., Vezzetti, E., & Piazzolla, P. (2017). How Kano model and QFD can improve customer satisfaction in service industries. *International Journal of Quality & Reliability Management*, 34(9), 1–17.
- Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of Marketing*, 60(2), 31–46.
<https://doi.org/10.1177/002224299606000203>