

FACTORS INFLUENCING SERVICE QUALITY AND PRODUCT QUALITY: A CASE STUDY OF A WATER FILTER COMPANY (PT XYZ)

Aulia Varatasya, Lara Wulandari, Erlinda N. Yunus¹

Sekolah Tinggi Manajemen PPM
Jl. Menteng Raya 9, Jakarta 10340, Indonesia

Article history:

Received
16 January 2025

Revised
27 March 2025

Accepted
18 April 2025

Available online
28 August 2025

This is an open access
article under the CC BY
license (<https://creativecommons.org/licenses/by/4.0/>)



ABSTRACT

Background: PT XYZ is a national private company operating in the water purification industry. Products offered by PT XYZ include water filters, reverse osmosis, and domestic waste processing machines with more than 23,000 customers in Indonesia. Over the last few years, the household product income of PT XYZ decreased from 2021 to 2023 with an average decrease of 5%. Apart from the decline in revenue, customer satisfaction scores have also not met the targets set by the company.

Purpose: This research was conducted to identify the factors affecting service quality and product quality in the water filter industry.

Design/methodology/approach: A mixed method approach was conducted in this research. Fifteen customers were interviewed and 367 customers filled out the questionnaire. Non-probability sampling was used in this research as a sampling method which was carried out by purposive sampling with several predetermined criteria. Items will be measured using 7 Likert scales.

Findings/results: The factors that determine service quality improvement at PT XYZ are excellent service, excellent after sales service, responsive customer care, and standardization and competence of the sales and service team. These factors represent the service quality improvement of 47.5%. The factors that determine product quality improvement at PT XYZ are reliable filters with optimal results, products that meet customer expectations, added filter maintenance indicator feature, and crack resistant filter. These factors represent the product quality improvement of 48.9%.

Conclusion: Increasing customer satisfaction and revenue, PT XYZ needs to provide excellent quality services. Good service quality management can also be a competitive advantage while encouraging continuous improvement. Improving the quality of PT XYZ's services and products is determined by excellent service, responsive after-sales service, competent and standardized teams, and reliable filter products that meet customer expectations, equipped with maintenance indicator features and are crack-resistant.

Originality/value (state of the art): This study emphasizes the importance of comprehensive quality improvement, encompassing both service and product aspects to maintain customer loyalty. PT XYZ should continuously invest in employee training and product innovation. This study enriches the literature on the determinants of customer satisfaction in the water filtration industry, particularly within the context of local companies.

Keywords: customer satisfaction, exploratory factor analysis, product quality, service quality, water filtration

How to Cite:

Varatasya, A., Wulandari, L., & Yunus, E. N. (2025). Factors influencing service quality and product quality: A case study of a water filter company (PT XYZ). *Business Review and Case Studies*, 6(2), 292. <https://doi.org/10.17358/brcs.6.2.292>

¹Corresponding author:

Email: erl@ppm-manajemen.ac.id

INTRODUCTION

Business competition is becoming increasingly fierce, and companies must understand customer expectations and perceptions of service quality to meet customer needs and desires. This, in turn, increases profits, satisfaction, and competitive positioning (Naude and Kloppers, 2016). To achieve this, companies must measure customer expectations and develop services that align with these expectations.

PT XYZ is a private national company that operates in the water purification industry. The products offered by PT XYZ include water filters, reverse osmosis, and domestic waste processing machines with more than 23,000 customers in Indonesia. As a provider of water purification products and services, PT XYZ must prioritize enhancing service quality, which is both exceptional and sustainable, to ensure long-term success and customer satisfaction. Customers tend to repurchase products or services when they feel satisfied, which encourages customer loyalty (Ahrholdt et al. 2017). To achieve maximum satisfaction, an enterprise needs to discover the factors that influence customer satisfaction, which may change the consumer experience when using a product or service (Tsai et al. 2024). Sertel (2017) states that there is a direct effect between customer satisfaction and customer loyalty on financial performance, while service quality indirectly affects financial performance. Additionally, service quality management can increase organizational success and facilitate efforts to improve sustainable service quality.

Over the last few years, the household product income of PT XYZ decreased in 2023, with an average decrease of 5%. In addition, customer satisfaction scores are yet to achieve the targets established by the company. PT XYZ has carried out a service and product quality assessment to determine how satisfied customers are with PT services and products XYZ. The dimensions measured among other customers are service responsibility, product service, product explanation, technician service, product delivery, product maintenance, product use, product price, product appearance, and product function. In 2023, the average customer satisfaction score for services at PT XYZ was 4.2 on a Likert scale of 5. However, if we look at the aspects of the questionnaire that have been carried out, the dimensions of measuring customer satisfaction at PT

XYZ are not yet comprehensive, so adjustments need to be made to the measurements and targets required. This adjustment of customer satisfaction measurement dimensions refers to Parasuraman et al. (1988) with 5 (five) dimensions of service quality assessment indicators used to evaluate services, namely Tangible, Empathy, Reliability, Responsiveness, and Assurance and 8 (eight) dimensions of product quality assessment according to Garvin (1984): performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality.

To respond to declining satisfaction levels and strengthen its market position, PT XYZ must prioritize the development of excellent service and product quality. Effective service quality management not only enhances customer experience, but also offers a sustainable competitive advantage through continuous improvement. Recognizing this strategic imperative, this study adopts a customer-centric approach by examining the voice of customers to identify key factors influencing service and product quality.

Despite the growing literature on service and product quality, there is a limited number of empirical studies that specifically explore these factors in the context of the water filtration industry in Indonesia. Most prior research has focused on broader consumer goods or service industries, leaving a gap in the understanding of the unique customer expectations and satisfaction drivers in this sector.

Addressing this gap would require a revisit of previous quality findings, both for product and services. To customize the unique customer expectations and satisfaction factors for the water filtration industry, an exploratory study is needed in the form of in-depth interviews with customers, followed by a confirmatory study using a survey to ensure the generalizability of the findings.

This study addresses this gap by investigating the extent to which service and product quality influence customer satisfaction in PT XYZ, a company specializing in water filtration systems. In doing so, it contributes not only to practical quality improvement strategies for the company but also to a broader theoretical understanding of customer satisfaction in specialized technology-driven industries.

METHODS

This research applied a quantitative and qualitative mixed-method approach. The steps of the methodology will be described in Table 1. The data used in this study are primary data obtained directly without intermediaries (Sekaran & Bougie, 2019). The primary data in this research were collected using two methods: interviews and questionnaires. This research was conducted at customer homes located in Jakarta, Bogor, Depok, Tangerang, and Bekasi for three months from October to December 2024. The data were collected through in-depth interviews and questionnaires. The interviews involved gathering information from customers regarding the factors that determine water filter purchasing decisions. The interview results were then used as a basis for determining themes and creating questions for the questionnaire. In this study, sufficient sources were needed to explore in-depth information. Boddy (2016) revealed that at least 15–30 people are needed as resources. According to Weller et al. (2018), even a small sample size can provide 95% of the most noticeable information. Therefore, this research interviewed 13 people to obtain deeper information regarding customer needs for the products or services offered by the company.

Questionnaires were created based on product or quality dimensions that contain customer expectations. Items will be measured using 7 Likert scales, such as strongly disagree, disagree, quiet disagree, neutral, quite agree, agree, and strongly agree. Non-probability sampling was used in this study as a sampling method, which was carried out by purposive sampling with several predetermined criteria. These criteria include:

- Customers still use PT XYZ's main products.
- Customers have actively purchased spare parts or repurchased products during the last two years.

A total of 367 samples were used, with a confidence level of 95% and a margin of error of 5%. Samples were taken from PT XYZ's customer list in 2019–2023 with 8000 customers. The questionnaire was created using Google Forms and distributed to PT XYZ customers.

According to Sekaran and Bougie (2019), the analysis in qualitative research involves three main processes: data reduction, data presentation, and drawing conclusions. First, the interview results were transcribed. In the data reduction process, the interview data will be processed by selecting and sorting important data through coding and categorization. Data presentation involves taking reduced data and presenting them in an organized and concise manner. Charts or matrices can help organize data and find patterns and relationships in the data, so that conclusions can be drawn.

Questionnaire data were processed using the JASP to obtain factor groups. The data in this study were first analyzed for validity and reliability. Data items were declared valid if they were convergent and determinant. Convergent validity measures the validity of the indicators as the measuring variables observed from each variable indicator. Convergent validity is assessed based on the loading factor, which is declared valid if the loading factor value is >0.5 (Hair et al. 2019). Discriminant validity tests the extent to which the latent construct is truly different from the other constructs. A high discriminant validity value indicates that a construct is unique and can explain the measured phenomenon. Discriminant validity is fulfilled if the loading of each indicator on the main factor is higher than the loading of the indicator on the other factors. Ideally, the loading on the main factor should be more than 0.5, and the cross-loading should be much lower. Data items were considered reliable if Cronbach's alpha value was ≥ 0.7 . The framework for this research is depicted in Figure 1.

Table 1. Steps of methodology

Step	Description
Data Collection	In-depth interviews (13 participants) and questionnaires (367 respondents)
Interview Analysis	Transcription → Coding → Categorization → Theming
Questionnaire Design	Based on interview themes; Likert-scale items
Sampling Method	Purposive sampling from PT XYZ's customer list (2019–2023)
Questionnaire Distribution	Google Forms
Data Analysis (Quantitative)	Conducted using JASP: validity, reliability, and factor analysis

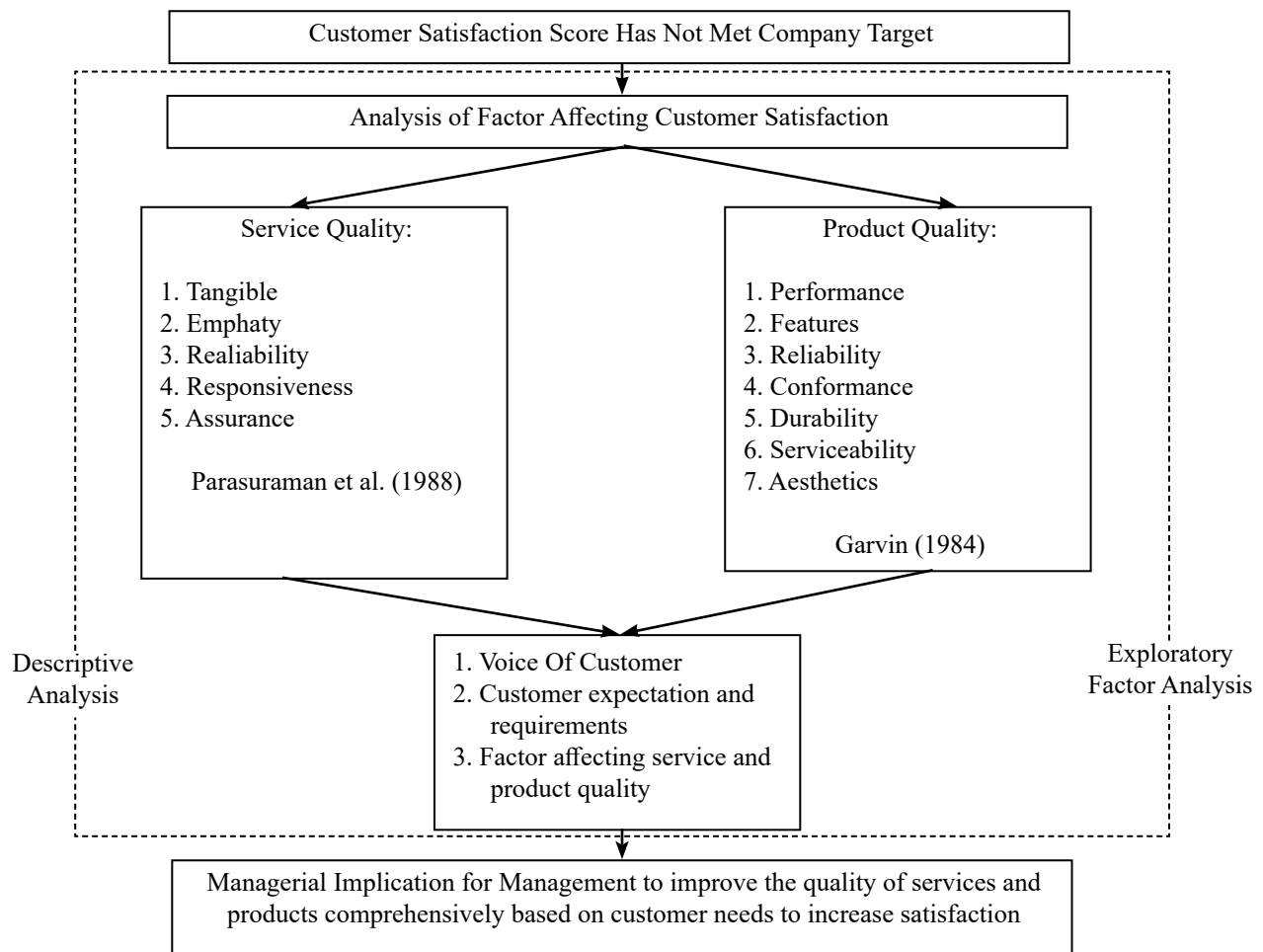


Figure 1. Research framework

RESULTS

Descriptive Analysis

Fifteen respondents were interviewed in depth to obtain their customer desires. The interviews were then developed into questionnaires. The number of respondents in this survey was 367 customers who were divided into several groups based on the type of filter used and the subscription period. These respondents are PT XYZ customers who use residential-type filters. Out of the 14 types of residential filters owned by PT XYZ, most of respondents use filters with type B (38.3%), type A as many as 16.8% of respondents, and as many as 13% of respondents used type filter type C. These three filters have something in common: they are made of PVC and have a manual backwash setting. For 3-5 years, 40.6% of customers had been using XYZ's filter, while 30.4% had been using it for long-term use for 5-10 years. Customers who have been customers since the period of 1-2 years have a proportion of 18.9%, and those over 10 years account for only 10.1%.

Service Quality

The overall Measure of Sampling Adequacy (MSA), along with the MSA for each item, was suitable for factor analysis. Additionally, the significant result from Bartlett's Test of Sphericity for Service Attributes (Chi-square = 224.139, $p < 0.001$) confirmed the suitability of the data for factor analysis.

Customer expectations were measured using a Likert scale, with a score of 1-7 to gain customer priorities. The average customer expectation of service is in the range of 4.61–6.379, indicating that the average customer agrees that the attributes can shape the service quality at PT HYDRO. The highest customer expectations are in the Sunday visit attribute, which is 6.379, followed by uniform competence between technicians (6.349), and effective communication skills of staff (6.259). Sunday visits indicate that customers want additional operational visits outside of working days to make it easier for them to meet directly with the staff. Uniform competence between technicians and effective communication skills of staff are due to the

desire of customers to have the same perception and knowledge to avoid misinformation given by staff to customers.

The quality attribute of water filter services focuses on the service quality of PT XYZ, which reflects customer experience in various aspects and is designed to provide a comprehensive service quality in PT XYZ. Attributes were grouped into factors using Exploratory Factor Analysis. An attribute is declared valid if it has a factor-loading value greater than 0.5. The results of the validity test of service attributes showed that there were 17 attributes declared valid, whereas seven other attributes were invalid. Invalid attributes were deleted and were not included in further testing. Valid attributes then form a group that is the determining factor for service quality, as shown in Table 2. A factor was declared reliable if it had a value of ≥ 0.7 .

Table 2. Mean of service attributes

Attribute	Mean
Sunday Visits	6.379
Uniform Competence Between Technicians	6.346
Effective communication skills of staff	6.259
Neat Clothing Improves Staff Image	6.259
Product or Service Quality Follow-Up Service	6.253
Communicative staff	6.207
SOP for Handling Product Problems	6.188
Filter Maintenance and Repair Training for Customers	6.155
Sales Team Experience in Purchasing Decisions	6.147
Maintenance Costs Informed Since Initial Purchase	6.101
Staff Quickly Respond to Customer Complaints and Requests	6.011
Clear and Regular Visit Schedules	6.008
Customer Problem Solving Ability	5.995
Delivery of Water Quality Information by Staff	5.959
Completeness of Product Information at Purchase	5.921
Ease of Understanding Maintenance Stickers	5.812
Product Prices Comparable to After-Sales Service	5.668
Media Replacement Costs According to the Benefits Offered	5.64
Excellent After-Sales Service	5.635
Staff Accessibility	5.594
Advance Home Service	5.556
Responsive Customer Feedback	5.349
Independent Repairs by Customers	5.052
Clarity of Information by Staff	4.61

Exploratory Factor Analysis (Table 3) groups attributes into the same factors. In terms of service attributes, there are four factors: excellent service, excellent after-sales service, responsive customer care, and standardization and competence of the sales and service teams, as shown in Table 4.

Service Excellent

This factor indicates that the customer needs comprehensive information, communication, and problem solving. Service excellently aligned with Reliability, Responsiveness, and Assurance on SERVQUAL dimension. This factor emphasizes the importance of clear information delivery, timely service, and trust in staff. Aslam et al. (2022) confirmed that there is a significant impact on employee performance with customer satisfaction; employees with high performance are more likely to have customer satisfaction. Wirtz and Zeithaml (2018) also state that service excellence is seen as a company that provides high-quality services, which, in turn, results in high customer satisfaction. Service excellence has been a vision for PT XYZ to become a leading water filter company. Instead, the customer still needs comprehensive information from the employees in PT XYZ.

Excellent after-sales services

The sales services in PT XYZ include maintenance and care. In PT XYZ, customers recommend that the price should be comparable to services and have a consistent schedule of maintenance. Excellent after-sales service can be mapped to the SERVQUAL dimensions of Responsiveness and Empathy, as it reflects PT XYZ's capacity to deliver prompt, customer-centric support in the post-purchase phase. This construct encompasses systematic follow-up mechanisms, transparent and consistent pricing structures, and reliable scheduling of service interventions. According to Shoukouhyar et al. (2020), after-sales service is not only an important requirement for a product, but also a major contributor for a business to increase its competitiveness. Among the several determinants of customer satisfaction, after-sales service acts as a definite predictor of customer satisfaction (Verma, 2022) as well as customer retention (Kumar, 2021).

Responsive customer care

Customers agree that feedback from customers must respond as quickly as possible. This factor is aligned with the responsiveness dimension of SERVQUAL, which refers to the willingness and ability of service providers to help customers and deliver prompt services (Parasuraman, Zeithaml, & Berry, 1988). At PT XYZ, customers emphasize the importance of timely responses to inquiries, complaints, and service requests, particularly in situations requiring immediate attention. The ability to address customer concerns efficiently is critical not only for resolving short-term issues but also for maintaining trust and encouraging future interactions. Empirical studies support the

centrality of responsiveness to service excellence. For instance, Sharma, Paul, Dhir, and Taggar (2023) found that responsiveness significantly influences customer satisfaction, repeat purchase intention, and referral behavior across service industries. Similarly, Anwar and Ali (2021) highlighted that quick feedback mechanisms and efficient customer service operations contribute to enhanced service perceptions and overall organizational performance. Thus, the responsiveness demonstrated through customer care at PT XYZ serves as a vital mechanism for reinforcing service quality perceptions, improving customer retention, and sustaining a competitive advantage in the water purification industry.

Table 3. Validity of Service Attributes

Service Attributes	Service Excellent	Excellent After Sales Service	Responsive Customer Care	Standardization and Competency of the Sales and Service Team
Complete Product Information When Purchasing	0.777			
Ease of Understanding Care Stickers	0.696			
Delivery of Water Quality Information by the XYZ Team	0.677			
Maintenance costs are informed from the initial purchase	0.642			
Product Prices Are Comparable to After Sales Services	0.615			
Problem Solving Ability	0.609			
Staff Quickly Respond to Customer Complaints and Requests	0.574			
Media Replacement Costs According to the Benefits Offered	0.572			
Sales Team's Experience on Purchase Decisions	0.57			
Independent Repair by Customer		0.709		
Excellent After Sales Service		0.644		
Clarity of Information by Staff		0.627		
Responsive Customer Feedback			0.747	
Staff Accessibility			0.664	
SOP for Handling Product Problems				0.647
Standardized Competency Between Technicians				0.64
Sunday Visit				0.538

Table 4. Factor loadings on service attributes

Factors	Eigenvalues	Unrotated Solution			Rotated Solution		
		SumSq. Loadings	Proportion var.	Cumulative	SumSq. Loadings	Proportion var	Cumulative
Service excellent	4.725	3.596	0.277	0.277	3.487	0.218	0.218
Excellent after sales service	2.008	1.367	0.105	0.382	1.51	0.094	0.312
Responsive customer care	1.741	0.914	0.07	0.452	1.357	0.085	0.397
Standardization and competency of the sales and service team	1.205	0.486	0.037	0.489	1.25	0.078	0.475

Standardization and competence of the sales and service teams. This factor corresponds to the SERVQUAL dimensions of assurance, which relate to employee knowledge, courtesy, and the ability to instill trust and empathy, reflecting the importance of individualized and consistent service delivery (Parasuraman, Zeithaml, & Berry, 1988). At PT XYZ, customers consistently emphasized the need for standardization in staff competency, particularly among technicians, to ensure the delivery of accurate, reliable, and uniform information. The findings indicate that discrepancies in staff responses and inconsistent service recommendations are common sources of customer dissatisfaction. This issue is frequently linked to a high turnover rate among frontline personnel, which disrupts organizational knowledge transfer and undermines consistency in service quality. As noted by Zeithaml, Bitner, and Gremler (2018), the dimensions of assurance and empathy are particularly vital in in-service environments where customers rely heavily on staff expertise to make informed decisions.

These four factors represent a service quality improvement of 47.5%, as seen in Table 4, consisting of excellent service (21.8%), excellent after-sales service (9.4%), responsive customer care (8.5%), and standardization and competence of the sales and service teams (7.8%).

Product Quality

The overall Measure of Sampling Adequacy (MSA), along with the MSA for each item, was suitable for factor analysis. Additionally, the significant result from Bartlett's Test of Sphericity for product attributes (Chi-square = 96.809, $p < 0.001$) confirmed the suitability of the data for factor analysis. The average customer expectation of products is in the range of 4.866–6.188, indicating that the average customer agrees that the

attributes in Table 5 can improve the product quality. The average customer expectation of the attribute "Easy to Detect Damaged Spare Parts" was the highest, with an average value of 6.188. Several attributes are also known to have high average expectation values: the filter attribute Can Withstand High Pressure (6.174), Heat Protection (6.150), Product According to Customer's desire (6.131), easy-to-detect frozen media (6.106), and Aesthetic Physical Form (6.104). This shows that customers agree if the product has sensors or tools that make it easier to detect damaged spare parts, the filter is designed to withstand high pressure, has a protector or cover to withstand heat, the product is based on customer wishes, the addition of sensors or tools that make it easier to detect saturated media, and the filter has an aesthetic form. On the other hand, the attribute with the lowest average expectation value is the attribute of "Easy to Open Chlorine Cylinder," with an average value of 4.866. This shows that customers tend to be neutral towards the ease of opening chlorine cylinders.

From a total of 18 attributes, 13 attributes in quality products are valid, as shown in Table 6. The deleted product attributes were aesthetic appearance (mean: 6.104), quick repair (5.883), strong tubes (5.937), large capacity (5.992), and easy self-maintenance (5.071).

Exploratory Analysis divides these attributes into four factors: reliable filters with optimal results, products that meet customer expectations, added filter maintenance indicator features, and crack-resistant filters.

The attributes for the first factor are leak-proof, tube cover that does not leak, cleanly filtered hardness particles, easy to open chlorine canister, cleanly filtered iron particles, and durable strainer. These attributes indicate that the customer needs the reliability of the product to solve their water problem. This is the highest

factor (22.1%). This factor aligns with Garvin's (1984) Performance, Reliability, and Durability dimensions. Customers increasingly expect water filters to not only function effectively but also to do so consistently over time without failure. Hoe and Mansori (2018) suggest that when a product demonstrates a high degree of technical reliability and structural durability, customer expectations are not only met, but also elevated, often resulting in greater satisfaction, loyalty, and positive word-of-mouth. In the context of PT XYZ, these findings underscore the importance of engineering design and material quality as key determinants of perceived product quality.

The second factor contains these attributes, specifically reliable quality, products according to customer needs, and durable media. These characteristics collectively

reflect customers' expectations for products that are not only functional but also tailored to their specific needs and usage contexts. This factor captures the importance of customer product fit, whereby product specifications align with user requirements and deliver consistent value throughout the product lifecycle.

This factor corresponds to Garvin's (1984) dimensions of conformance, the degree to which a product meets design and performance standards, and Perceived Quality, which refers to the customer's judgment of overall excellence. As emphasized by Kosasih et al. (2024), product quality that aligns with customer expectations plays a critical role in fostering customer satisfaction and loyalty, both of which are key drivers of long-term business sustainability and customer retention.

Table 5. Mean of product attributes score

Attributes	Mean	Attributes	Mean
Easy to Detect Damaged Spare Parts	6.188	Strong Cylinder	5.937
Filter Can Withstand High Pressure	6.174	Quick Repair	5.883
Heat Protection	6.15	Leak-Proof Filter	5.586
Product According to Customer's Desire	6.131	Tub's Cap Leak-Proof	5.409
Easy to Detect Frozen Media	6.106	Durable Strainer Filter	5.24
Aesthetic Physical Form	6.104	Iron Particles Are Cleanly Filtered	5.237
Durable Media	5.992	Hardness Particles Are Cleanly Filtered	5.199
Large Filter Capacity	5.992	Easy to Do Basic Self-Maintenance	5.071
Reliable Water Filter Quality	5.959	Easy to Open Chlorine Tube	4.866

Table 6. Validity of product attributes

Attributes	Reliable filter with optimal results	Products that meet customer expectations	Additional filter maintenance indicator feature	Crack-resistant filter
Anti-Leak Filter	0.783			
Tub's Cap Leak-Proof	0.732			
The Lime Particles Are Filtered Cleanly	0.688			
The Chlorine Tank Is Easy To Open	0.664			
The Iron Particles Are Filtered Cleanly	0.659			
The Durable Filter Strainer	0.551			
Reliable Water Filter Quality		0.771		
The Product As Desired		0.7		
The Durable Media		0.595		
Easy to Detect Damaged Spare Parts			0.968	
Easy to Detect Frozen Media			0.503	
The Filter Can Withstand High Pressure				0.573
Heat Protection				0.545

The third factor is characterized by attributes such as easy detection of damaged spare parts and identification of saturated or clogged filter media. These features reflect customer expectations of greater visibility in product conditions and more effective mechanisms for self-monitoring filter performance. Customers demonstrate a clear preference for product designs that offer proactive maintenance cues, enabling them to take timely action without relying entirely on external service support. This factor aligns with Garvin's (1984) **dimensions of Features**, the secondary characteristics that enhance product usability, and **dimension of Serviceability**, which refers to the ease with which a product can be maintained and repaired. As Hoe and Mansori (2018) noted, the inclusion of intelligent or user-friendly features in durable products can elevate customer expectations and satisfaction, especially when such features enhance the perceived control and autonomy of users over the product lifecycle. For PT XYZ, integrating maintenance indicators can serve as a strategic differentiator by enhancing both the functional value and customer engagement.

The fourth factor pertains to the crack resistance of water filters, emphasizing their ability to endure high pressure and prolonged exposure to direct sunlight and elevated temperatures. This consideration is particularly pertinent, as many customers install water filters in outdoor or elevated locations, including rooftops, where they are subjected to varying weather conditions. Extended exposure to such elements can compromise material integrity, leading to physical degradation such as cracking, which adversely affects product performance and longevity. This factor corresponds to Garvin's dimensions of durability, the product's ability to withstand wear over time, and Design Quality, which reflect how well a product's features accommodate real conditions and user expectations (Garvin, 1984). Cooper et al. (2018) found that product longevity and material robustness significantly influence consumer perceptions and purchasing decisions across the durable goods sectors. Similarly, Sabbir (2025) argued that product features and lifespan are key determinants of perceived quality and can shape long-term consumer loyalty. For PT XYZ, these findings reinforce the strategic importance of investing in material innovation and engineering design to enhance crack resistance and to ensure alignment with customer expectations.

Table 7 shows that these factors represent a product quality improvement of 48.9%, consisting of reliable filters with optimal results (22.1%), products that meet customer expectations (11.9%), added filter-maintenance indicator features (9.6%), and crack-resistant filters (5.3%).

Managerial Implications

Factors desired by customers can be improved by strengthening organizational functions. The recommended action plan for companies to improve service quality is to develop people in service operations. One of the determinants of service quality lies in the people in the service or those who act as frontliners or back offices. In particular, frontliners must be able to convey detailed and clear information. Behind the scenes, HR works as a team. HR must convey the same information, abilities, and accuracy of problem solving. Shokoohyar et al. (2020) stated that staff professionalism is one of the "must-be" factors in after-sales service, which means that if these needs are not met, they will cause consumer dissatisfaction, but if they are met, it does not guarantee that consumers will be satisfied. Shookhyar et al. (2020) stated that staff competence and responsiveness are included in the "one-dimensional" after-sales service factors, which means that fulfilling the right needs will increase consumer satisfaction, and if the fulfillment is inadequate, it will cause dissatisfaction. To achieve customer satisfaction, companies must develop professionalism, responsiveness, and staff competence. The recommended action plan for companies to improve product quality involves the Development of Leak-Resistant and Crack-Resistant Filters. The design that can be improved to improve product consistency and minimize defective products is molding. According to Zhao et al. (2020), injection molding is one of the most important material processing methods for mass production of plastic products. Through comprehensive sensing, optimization, and control methods, intelligent injection molding can improve production efficiency to obtain high-quality and stable production (Zhao et al. 2020).

Table 7. Proportions of product attributes

Factors	Eigenvalues	Unrotated Solution			Rotated Solution		
		SumSq. Loadings	Proportion var.	Cumulative	SumSq. Loadings	Proportion var	Cumulative
Reliable filter with optimal results	4.086	3.596	0.277	0.277	2.872	0.221	0.221
Products that meet customer expectations	1.8	1.367	0.105	0.382	1.548	0.119	0.34
Added filter maintenance indicator feature	1.362	0.914	0.07	0.452	1.252	0.096	0.436
Crack resistant filter	1.069	0.486	0.037	0.489	0.69	0.053	0.489

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The factors that determine service quality improvement at PT XYZ are excellent service, excellent after-sales service, responsive customer care, and standardization and competence of the sales and service teams. These factors represented a service quality improvement of 47.5%. The factors that determine the product quality improvement at PT XYZ are reliable filters with optimal results, products that meet customer expectations, added filter maintenance indicator features, and crack-resistant filters. These factors represent a product quality improvement of 48.9%.

These findings support prior research emphasizing the multidimensional nature of quality in both service and manufacturing contexts. The role of service excellence and staff competence aligns with Wirtz and Zeithaml (2018), who highlight operational efficiency and frontline proficiency as keys to cost-effective services. Likewise, the importance of responsive customer care reinforces Sharma et al. 's(2023) view of responsiveness as a driver of satisfaction and repeat behavior.

In terms of product quality, this study affirms Garvin's (1984) framework that integrates both functional and perceived attributes. The relevance of features such as maintenance indicators and durability reflects findings by Hoe and Mansori (2018) on the importance of reliability in customer satisfaction and aligns with Kosasih et al. (2024), who underscore the impact of innovation on long-term loyalty.

To ensure a well-rounded interpretation of the findings, it is essential to consider the contextual limitations inherent in the study's design and scope. The focus on PT XYZ's residential customers within

a specific geographic area (Jabodetabek) provides depth and specificity but may limit generalizability to other market segments or regions. Additionally, as is common in perception-based studies, the use of self-reported survey data introduces a potential for response bias. Nevertheless, methodological rigor, sample size, and integration of both qualitative and quantitative techniques contribute to the reliability and practical relevance of the findings.

Recommendations

Based on the research results, the company must make several improvements. To improve service quality, the company needs to take notice of service excellence, after-sales service, responsive customer care, and standardization and competence of the sales and service team. To improve product quality, companies need to pay attention to reliable filters with optimal results, products that meet customer expectations, added filter maintenance indicator features, and crack-resistant filters. Further research can explore the analysis of performance gaps and customer expectations, employee performance analysis, and six-sigma analysis.

FUNDING STATEMENT: This study did not receive any specific grants from public, commercial, or not-for-profit funding agencies.

CONFLICT OF INTEREST: The authors declare no conflicts of interest.

REFERENCES

Ahrholdt, D. C., Gudergan, S. P., & Ringle, C. M. (2017). Enhancing service loyalty: The roles of delight, satisfaction, and service quality. *Journal of Travel Research*, 56(4), 436–450. <https://doi.org/10.1177/0047260617711111>

- org/10.1177/0047287516649058
- Ali, B. J., Saleh, P. F., Akoi, S., Abdulrahman, A. A., Muhamed, A. S., Noori, H. N., & Anwar, G. (2021). Impact of service quality on the customer satisfaction: Case study at online meeting platforms. *International Journal of Engineering, Business and Management*, 5(2), 65–77. <https://doi.org/10.22161/ijebm.5.2.6>
- Aslam, W., Farhat, K., Arif, I., & Chai, L. G. (2022). What matters most in achieving customer satisfaction in banking? A study from the perspective of employee characteristics. *TQM Journal*, 34(4), 627–650. <https://doi.org/10.1108/TQM-08-2020-0195>
- Boddy, C. R. (2016). Sample size for qualitative research. *Qualitative Market Research*, 19(4), 426–432. <https://doi.org/10.1108/QMR-06-2016-0053>
- Cooper, T., Hannon, E., & Gillard, R. (2018). Consumer perspectives on longevity and reliability: A national study of purchasing factors across eighteen product categories. *Procedia CIRP*, 69, 910–915. <https://doi.org/10.1016/j.procir.2017.11.151>
- Garvin, D. A. (1984). What does product quality really mean? *Sloan Management Review*, 26(1), 25–43. <https://www.proquest.com/scholarly-journals/what-does-product-quality-really-mean/docview/2081489739/se-2>
- Hair, J. F. J., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Pearson Education Limited.
- Hoe, L. C., & Mansori, S. (2018). The effects of product quality on customer satisfaction and loyalty: Evidence from Malaysian engineering industry. *International Journal of Industrial Marketing*, 3(1), 20–35. <https://doi.org/10.5296/ijim.v3i1.13959>
- Kosasih, O., Hidayat, K., Hutahayan, B., & Sunarti. (2024). Achieving sustainable customer loyalty in the petrochemical industry: The effect of service innovation, product quality, and corporate image with customer satisfaction as a mediator. *Sustainability*, 16(16), 7111. <https://doi.org/10.3390/su16167111>
- Kumar, V., & Ayodeji, O. G. (2021). E-retail factors for customer activation and retention: An empirical study from Indian e-commerce customers. *Journal of Retailing and Consumer Services*, 59, 102399. <https://doi.org/10.1016/j.jretconser.2020.102399>
- Naude, P., & Rudansky-Kloppers, S. (2016). Perceptions of customers regarding their expectation of service quality in South African full-service restaurants. *International Business & Economics Research Journal*, 15(2), 55–68. <https://doi.org/10.19030/iber.v15i2.9609>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12–40. <https://doi.org/10.2307/1251430>
- Reynagonzález, J. E., Pérez, M., David, R., Huari, M. Y. Á., Ruiz, M. J. P., & Galopino, C. A. T. (2024). Differentiation strategy to improve the level of customer satisfaction: Case study of an industrial process company in Peru. *Journal of Electrical Systems*, 20(4), 1437–1447. <https://www.proquest.com/scholarly-journals/differentiation-strategy-improve-level-customer/docview/3073676244/se-2>
- Sabbir, M. M. (2025). Product feature and lifespan as a quality indicator for inducing eco-friendly furniture purchase. *Heliyon*, 11(3), e42422. <https://doi.org/10.1016/j.heliyon.2025.e42422>
- Sekaran, U., & Bougie, R. (2019). *Research methods for business: A skill-building approach* (8th ed.). Wiley Global Education US. <https://bookshelf.vitalsource.com/books/9781119561248>
- Sertel, E. (2017). Customer satisfaction, loyalty, and financial performance in the tourism and hospitality industry: Evidence from North Cyprus. *Journal of Economic & Management Perspectives*, 11(4), 702–716.
- Sharma, D., Paul, J., Dhir, S., & Taggar, R. (2023). Deciphering the impact of responsiveness on customer satisfaction, cross-buying behaviour, revisit intention and referral behaviour. *Asia Pacific Journal of Marketing and Logistics*, 34(10), 2052–2072. <https://doi.org/10.1108/APJML-07-2021-0465>
- Shokouhyar, S., Shokoohyar, S., & Safari, S. (2020). Research on the influence of after-sales service quality factors on customer satisfaction. *Journal of Retailing and Consumer Services*, 56, 102139. <https://doi.org/10.1016/j.jretconser.2020.102139>
- Tsai, C.-C., Lin, C.-L., & Chen, Y.-H. (2024). Impact of authenticity perception on experiential value and customer satisfaction under contactless services. *Systems*, 12(1), 19. <https://doi.org/10.3390/systems12010019>
- Verma, P. (2022). After-sales service shaping assortment

- satisfaction and online repatronage intention in the backdrop of social influence. *International Journal of Quality and Service Sciences*, 14(4), 595–614. <https://doi.org/10.1108/IJQSS-09-2021-0119>
- Weller, S. C., Vickers, B., Bernard, H. R., Blackburn, A. M., Borgatti, S., Gravlee, C. C., & Johnson, J. C. (2018). Open-ended interview questions and saturation. *PLOS ONE*, 13(6), e0198606. <https://doi.org/10.1371/journal.pone.0198606>
- Wirtz, J., & Zeithaml, V. (2018). Cost-effective service excellence. *Journal of the Academy of Marketing Science*, 46(1), 59–80. <https://doi.org/10.1007/s11747-017-0560-7>
- Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2018). *Services marketing: Integrating customer focus across the firm* (7th ed.). McGraw-Hill Education.