World Journal of Advanced Engineering Technology and Sciences
eISSN: 2582-8266
Cross Ref DOI: 10.30574/wjaets
Journal homepage: https://wjaets.com/

(CASE REPORT)

STRATEGIC DESIGN FOR THE ENHANCEMENT OF CUSTOMER SATISFACTION IN CAFÉ ESTABLISHMENTS

Nia Budi Puspitasari *, Darianov Faghfirly Aswin and Aries Susanty

Industrial Engineering Department, Faculty of Engineering, Universitas Diponegoro, Tembalang, Semarang, Indonesia.
* Corresponding Author

ORCID Details
Nia Budi Puspitasari: https://orcid.org/0000-0003-3141-8138
Aries Susanty: https://orcid.org/0000-0003-0601-5206

World Journal of Advanced Engineering Technology and Sciences, 2026, 21(01), 054–060

Publication history: Received on 26 August 2026; revised on 02 October 2026; accepted on 05 October 2026

Article DOI: https://doi.org/10.30574/wjaets.2026.21.1.0465

Copyright © 2026 Author(s) retain the copyright of this article. This article is published under the terms of the Creative Commons Attribution License 4.0

ABSTRACT

This research examines the SADT (Structured Analysis and Design Technique) transformation process and identifies the risks at ABC Cafe. This research found 11 failure modes with very high risks and 10 other failure modes with undesirable risks. To address these problems and improve service quality and customer satisfaction, several corrective actions are recommended. First, improve employee capabilities through structured and ongoing on-the-job training programs. Second, develop a systematic service review mechanism to monitor and evaluate employee performance periodically. Third, repair damaged or underperforming equipment as soon as possible to ensure smooth operations. Implementing these actions is expected to reduce the risk of failure, increase operational efficiency, and ultimately improve customer satisfaction at ABC Cafe.

Keywords: Customer satisfaction, Failure Modes, Risk, Service quality

1 INTRODUCTION

Indonesia is one of the world's largest coffee-producing countries. Indonesia's coffee industry is developing positively, especially in the high-quality coffee segment, such as Arabica and Robusta. Indonesian coffee production increased from 9.7 million quintals in the 2019/2020 season to 10.3 million quintals in the 2020/2021 season, according to International Coffee Organization (ICO) data. This growth was followed by an increase in independent coffee shops and roasteries in big cities, as well as an increase in domestic coffee consumption, which reached 750 thousand tons in 2021, up from 650 thousand tons the previous year. The increase in the number of coffee shops encourages coffee and snack consumption and contributes to the economy by creating jobs, increasing the income of coffee farmers, and tourism (Lee, 2022).

Consumers tend to look for information about coffee shops online before buying or visiting (Nadiri & Gunay, 2013). The development of technology and digital media such as Instagram, Facebook, and WhatsApp play an important role in coffee shop marketing and operations. Instagram now offers features that help entrepreneurs, such as links in Instagram

Stories. Therefore, Instagram is a suitable social media platform for brands and companies that are developing businesses, such as marketing and connecting with their audience (Miller, 2020).

ABC cafe uses Instagram for promotion and branding, as well as offering coffee-based and non-coffee products targeting the young market. However, ABC Cafe experienced a decline in sales during the last six months of 2023, even though it has a rating of 4.5/5 on Google Reviews and 3.9 on Digikuliner. Common problems include poor service, poor coffee quality, incomplete menus, and uncomfortable outdoor seating.

The Structured Analysis and Design Technique (SADT) method breaks down a system's activity process and explains its operating procedures (Salem & Amraoui, 2016). The Failure Mode Effect Analysis (FMEA) method can identify process activities that require more monitoring or priority improvements (Kammoun et al., 2021).

This research aims to identify factors that influence the intention to purchase coffee at ABC Cafe and provide strategy recommendations to increase people's interest in visiting the coffee shop.

1.1 Risk Assessment Using FMEA

The Failure Mode and Effects Analysis (FMEA) conducted at ABC Cafe revealed critical areas that require immediate attention in the service process. This comprehensive analysis examined various aspects of the customer experience, from arrival to departure, and identified several high-risk factors that could significantly impact customer satisfaction and overall service quality.

Table 1: Order of Customer Requirements (CR)

Process Code	Process	RPN (Highest)	FMEA Ratings
A1	Customers come	25	1
A2	Customer orders	16	5
A3	Customer pays	20	2
A4	Make customer orders	20	3
A5	Serving orders	16	6
A6	Clean and tidy the table	20	4

The FMEA results showed that all activities in ABC Cafe's service process had Risk Priority Numbers (RPNs) ranging from 15 to 25, indicating unacceptable risk levels. These high RPNs suggest that the current processes are prone to failures that could severely affect customer experience and the business's reputation. The most critical issue identified was the uncomfortable atmosphere due to insufficient air circulation, which received the highest RPN of 25. This indicates that the coffee shop's physical environment is a major concern for customers and could be a primary driver of dissatisfaction. The sultry, hot atmosphere not only affects customer comfort but could also affect the length of their stay and the likelihood of return visits.

Another significant issue was the lack of cash for payments, influenced by the growing trend of digitalization, which received an RPN of 20. This highlights the need for ABC Cafe to adapt to changing payment preferences while still accommodating traditional methods. The inability to handle various payment types efficiently could lead to customer frustration and potential loss of business. Long order creation times, also with an RPN of 20, were attributed to incompetent staff and equipment issues. This points to underlying problems in staff training and equipment maintenance, both of which are crucial for efficient service delivery in a coffee shop setting. Delays in order preparation can significantly impact customer satisfaction, especially for those with time constraints.

Annoying insects, another issue with an RPN of 20, were linked to inadequate cleaning procedures. This not only affects customer comfort but also raises concerns about hygiene and food safety, which are paramount in the food service industry. Other notable issues included menu unavailability (RPN: 16), incorrect order serving (RPN: 16), and unfriendly waiters (RPN: 8). While these had lower RPNs, they still contributed to the overall customer experience and should not be overlooked.

The FMEA results indicate that ABC Cafe faces multifaceted challenges in its service delivery. The high RPNs across various aspects of the service process suggest that improvements are needed at multiple levels, from staff training and equipment maintenance to cleanliness procedures and menu management. This risk assessment gives ABC Cafe a clear

picture of where to focus its efforts to improve service quality. By addressing these high-risk areas, the coffee shop can significantly improve customer satisfaction, reduce complaints, and create a more pleasant dining experience. The FMEA results serve as a valuable tool for prioritizing improvement efforts and allocating resources effectively to address the most critical issues first.

Moreover, the FMEA process itself is a proactive approach to quality management. By identifying potential failure modes before they lead to customer dissatisfaction, ABC Cafe can take preventive measures, potentially saving costs and maintaining its reputation in the long run. Regular FMEA assessments could help the coffee shop stay ahead of potential issues and continuously improve its service quality.

1.2 Identification of Corrective Actions

Based on the comprehensive FMEA results, a wide range of corrective actions were proposed to address the identified issues at ABC Cafe. These actions were categorized into six key areas: Man, Machine, Materials, Methods, Environment, and Management, providing a holistic approach to improving service quality.

Table 2: Specifications and Potential Improvements for Any Problems That May Arise

Design Requirements	Potential Improvement
Man	Using Person-Job-Fit in Selecting Prospective Employees Increasing employee capabilities with OJT, Demonstration, and Example. Create a review system for customers regarding unsatisfactory service.
Machine	Make repairs as soon as possible to prevent reduced production levels and subsequent delays. Provide materials and demonstrate how to use, clean, and maintain equipment Carry out general maintenance on equipment once a month Ensure that each machine gets the maximum electricity supply.
Materials	*Updates*book menus periodically, especially those with inappropriate information Ensure raw materials comply with SNI Improve raw material stock management using the economic order quantity (EOQ) method
Methods	Create training plans for employees and provide regular training sessions to ensure employees know the correct procedures at work. Improve and update the non-cash payment system for customers
Environment	Arrange tables and chairs so that the flow of customers and staff is not disrupted Increase the number of fans and air conditioners in hot areas Increase supervision of employee work activities
Management	Set goals offer rewards and incentives. Improve internal communication and coordination between employees Implement total quality management (TQM)

Table 2 lists the design requirements and potential improvement actions that were developed as a result of using the cause-and-effect analysis from the FMEA, discussion with the management at ABC Cafe, and review of other studies (Darwin et al., 2021; Kanyan et al., 2016). For each of the six design requirement categories, there are three possible improvement actions; therefore, 18 improvement actions exist. The following lists each category's improvement actions.

In the 'Man' category, the report suggested several crucial actions. The report proposed implementing a person-job-fit approach in employee selection to ensure new hires have the necessary skills and attributes for their roles. This could significantly reduce issues related to incompetent staff and unfriendly service. When Sura Coffee is recruiting new employees, they should make sure that each applicant's abilities and personality match the position that they are applying for. When an applicant's personality and skills align with what the job demands, then that employee will be more productive in his/her role, have a higher level of job satisfaction, and less likely to quit the company. Research has demonstrated that when there is a strong connection between the individual and the job, there are higher levels of motivation at work and better overall performance (Kristof-Brown et al., 2005). Another key recommendation was to enhance employee capabilities through structured on-the-job training programs. Research shows that on-the-job

training (OJT), combined with demonstrations and practical examples, can be more effective at developing practical skills and transferring knowledge than traditional training methods (Noe, 2010). This continuous learning approach could help address problems such as long order creation times, incorrect order serving, and general service quality issues. The report also suggested creating a customer review system to enable direct feedback and swift responses to service issues. Customers who feel valued are more likely to return and recommend the business to others (Zeithaml et al., 2009).

For the 'Machine' category, the focus was on equipment reliability and proper usage. Timely repairs were emphasized to prevent delays in order preparation and maintain consistent service quality. Regularly scheduled maintenance of coffee shop equipment will allow you to maintain high levels of productivity and help to eliminate delays in service to your customers. There is a body of research which shows how regularly scheduled maintenance of coffee shop equipment can reduce down time, increase the efficiency of operations, prolong the useful life of equipment, and ultimately decrease the cost of repairs in the future (Swanson, 2001; Campbell & Reyes-Picknell, 2006). The report suggested comprehensive training on equipment use and maintenance to ensure all staff can operate machinery effectively and safely. Another recommendation was to ensure a reliable electricity supply to prevent service disruptions from equipment failures. Effective power management is essential for maintaining operational continuity while improving the reliability and efficiency of café equipment (Baggini, 2008).

In terms of 'Materials', the study proposed regularly updating menu information to prevent menu unavailability. The study also suggested ensuring raw materials comply with standards to maintain food quality and safety and improving stock management using methods like the Economic Order Quantity (EOQ) to prevent stock-outs and reduce waste. Research shows that compliance with food safety standards can reduce contamination risk, improve product quality, enhance consumer trust, and strengthen a company's market position (Jahn et al., 2005). Implementing Economic Order Quantity (EOQ) can improve inventory management efficiency, reduce operating costs, accommodate demand fluctuations, and optimize inventory levels. The method can also strengthen supply chain management, improve inventory planning and control, and ultimately increase profitability for café businesses (Chopra & Meindl, 2013).

For 'Methods', the report recommended creating comprehensive training plans. Continuous training is essential for ongoing employee development and investing in employee training can improve job performance and increase employee loyalty (Kraiger et al., 2014). The report also recommended improving non-cash payment systems to address payment-related issues. Improving the cashless payment system for customers is an important step toward enhancing the efficiency and convenience of the payment process at ABC Cafe (Arango et al., 2015).

In the 'Environment' category, the study suggested optimizing seating arrangements to improve customer comfort and flow (J. C. Lee et al., 2021). Improving air circulation was a critical recommendation to address the uncomfortable atmosphere that received the highest RPN in the FMEA. Maintaining a comfortable temperature in customer areas can encourage longer visits and increase customers' intention to return (Choi et al., 2018). The study also proposed increasing supervision of work activities to ensure adherence to cleanliness procedures and prevent issues such as annoying insects. By implementing more effective supervision, ABC Cafe can ensure that tasks are carried out accurately and efficiently, thereby improving customer satisfaction and contributing to overall business success (Liu et al., 2019).

Lastly, in the 'Management' category, the study suggested setting clear goals and offering incentives to motivate staff and improve overall service quality. Structured incentive programs have been shown to improve both individual and team performance within an organization (Armstrong & Murlis, 2007). The study also recommended improving internal communication to ensure all staff are aligned on service standards and procedures. By improving internal communication and coordination, Sura Coffee can foster a productive and harmonious workplace (Zhu et al., 2018). The study proposed implementing total quality management (TQM) as an overarching strategy to build a culture of continuous improvement at ABC Cafe.Total Quality Management (TQM) can improve operational efficiency, quality, and overall performance, with employee involvement playing a key role in achieving positive outcomes (Zehir et al., 2012). These corrective actions provide a comprehensive roadmap for ABC Cafe to systematically address its service quality issues. By implementing these actions, the cafe can potentially resolve the high-risk issues identified in the FMEA, improving customer satisfaction and business performance.

While all these actions are valuable, they may not be implementable simultaneously because of resource constraints. Therefore, prioritization based on the FMEA results and the coffee shop's specific circumstances would be crucial. Some actions, like improving air circulation and implementing staff training programs, may need to be prioritized because they can immediately reduce risk in high-risk areas. Moreover, these corrective actions should not be viewed as one-time fixes, but as part of an ongoing improvement process. Regular assessments and adjustments based on effectiveness and changing customer needs would be essential for long-term success.

1.3 Prioritization of Design Requirements

The Quality Function Deployment (QFD) analysis provided crucial insights into prioritizing design requirements for improving service quality at ABC Cafe. This customer-centric approach translated customer needs into specific technical requirements, enabling a structured improvement process.

Tabel 3: Individual DRj Index

CRi	**Wi**	**DRj**					
		Man	*Machine*	*Materials*	*Methods*	*Environment*	*Management*
Customers come	5	9	0	0	9	9	9
Customer orders	3	9	3	9	9	1	9
Customer pays	4	9	9	9	3	3	9
make customer orders	4	9	3	9	9	9	9
serving orders	3	9	1	9	9	9	3
clean and clear the table	4	9	9	9	9	9	3
DRj Index		207	96	162	183	159	165

The QFD analysis resulted in a prioritized list of design requirements, each with its corresponding DRj index. The 'Man' category emerged as the top priority with the highest DRj index of 207, significantly higher than the other categories. This underscores the critical importance of human factors in service quality improvement at Cafe. The high priority of the 'Man' category suggests that focusing on employee-related aspects should be ABC Cafe's primary strategy for enhancing service quality. This includes addressing staff competence, customer interaction skills, adherence to procedures, and overall service attitude. The significant impact of human factors on customer satisfaction is evident, and improvements in this area could potentially resolve multiple high-risk issues identified in the FMEA, such as unfriendly service, long order creation times, and incorrect order serving.

Following 'Man', the 'Methods' category ranked second with a DRj index of 183. This highlights the importance of well-defined, efficient processes. Improving methods could involve refining standard operating procedures, optimizing workflows, and implementing better systems for order-taking and processing. Enhancements in this area could address issues like long waiting times and order accuracy. 'Management' ranked third with a DRj index of 165, emphasizing the role of effective leadership and organizational practices in service quality. This could involve improving communication structures, setting clear performance standards, and fostering a customer-centric culture throughout the organization.

'Materials' came fourth with a DRj index of 162, highlighting the importance of quality inputs in service delivery. This could involve ensuring consistent quality of coffee beans, food ingredients, and other supplies, as well as efficient inventory management to prevent stockouts. The 'Environment' category ranked fifth with a DRj index of 159. While lower in priority than human and process factors, the physical environment still plays a significant role in customer experience. This could include addressing issues like air circulation, seating comfort, and the coffee shop's overall ambiance.

Lastly, the 'Machine' category had the lowest DRj index of 96. While still important, this suggests equipment-related issues may have less direct impact on customer satisfaction than human and process factors. However, reliable, efficient equipment operation remains crucial for smooth service delivery. This prioritization provides ABC Cafe with a clear roadmap for improvement efforts. By focusing primarily on enhancing employee capabilities and performance, followed by refining methods and management practices, the coffee shop can address the most impactful areas of service quality.

However, while this prioritization helps guide improvement efforts, it doesn't mean lower-ranked categories should be neglected. All aspects contribute to the overall service quality and customer experience. The prioritization simply suggests where to allocate initial efforts and resources for maximum impact. Moreover, these priorities should be viewed dynamically. As improvements are made in higher-priority areas, the relative importance of other categories may change. Regularly reassessing priorities using QFD and other quality management tools would help ensure continuous improvement across all aspects of service delivery.

In implementing improvements based on this prioritization, ABC Cafe should consider the interrelations between different categories. For example, improvements in the 'Man' category might require corresponding enhancements in

'Methods' and 'Management' to be fully effective. Similarly, improvements in 'Environment' might necessitate changes in 'Machine' or 'Materials'. By strategically addressing these prioritized design requirements, Cafe can systematically enhance its service quality, leading to improved customer satisfaction, increased customer loyalty, and ultimately, better business performance.

2 CONCLUSION

The conclusion of this study indicates that data processing using the Failure Mode and Effects Analysis (FMEA) method revealed that all aspects of the service process at the café require improvement, as they have high Risk Priority Number (RPN) values, indicating unacceptable levels of risk. The study categorized the design requirements using a Cause-and-Effect Analysis (CEA) diagram into six categories: man, machine, material, method, environment, and management. Each category includes three potential improvement actions, for a total of 18. Examples of corrective actions include selecting employees based on job suitability, providing job-related training, conducting regular equipment maintenance, updating the menu, and improving communication and coordination among employees.

The Quality Function Deployment (QFD) method was used to prioritize the café's design requirements. The results identified management-related design requirements as the most critical aspect requiring improvement. Several recommendations can improve service quality at the café. These include adopting the person-job fit concept to improve the employee selection process and address server skill deficiencies. Providing appropriate job training is also necessary to strengthen employees' competencies and ensure their abilities and personalities align with job requirements during recruitment. Aligning individuals with their respective jobs is expected to improve employee performance and job satisfaction, reduce turnover rates, and enhance workplace motivation.

Previous research has demonstrated that a well-organized customer review system can improve customer satisfaction and loyalty. Customers who feel valued are more likely to revisit the café and recommend it to others. In addition, a systematic review mechanism can motivate employees to consistently provide excellent service, as they know customers directly evaluate their performance.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Acknowledgments

The author would like to thank all parties who have contributed to this research.

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

REFERENCES

[1] Arango, C., Huynh, K. P., & Sabetti, L. (2015). Consumer payment choice: Merchant card acceptance versus pricing incentives. *Journal of Banking & Finance*, *55*, 130–141. https://doi.org/10.1016/j.jbankfin.2015.02.005

[2] Baggini, A. (2008). *Handbook of Power Quality* (A. Baggini, Ed.). Wiley. https://doi.org/10.1002/9780470754245

[3] Campbell, J. D., & & Reyes-Picknell, J. V. (2006). Uptime: Strategies for Excellence in Maintenance Management (2nd ed.). *CRC Press*.

[4] Choi, J., Ghaffari, R., Baker, L. B., & Rogers, J. A. (2018). Skin-interfaced systems for sweat collection and analytics. *Science Advances*, *4*(2). https://doi.org/10.1126/sciadv.aar3921

[5] Chopra, S., & Meindl, P. (2013). *Supply Chain Management: Strategy, Planning, and Operation (5th ed.). Pearson*.

[6] Darwin, M., Mamondol, M. R., Sormin, S. A., Nurhayati, Y., Tambunan, H., Sylvia, D., Adnyana, I. M. D. M., Prasetiyo, B., Vianitati, P., & Gebang, A. A. (2021). *Metode Penelitian Kuantitatif*. Media Sains Indonesia.

[7] Jahn, G., Schramm, M., & Spiller, A. (2005). The Reliability of Certification: Quality Labels as a Consumer Policy Tool. *Journal of Consumer Policy*, *28*(1), 53–73. https://doi.org/10.1007/s10603-004-7298-6

[8] Kammoun, A., Hachicha, W., & Aljuaid, A. M. (2021). Integrating quality tools and methods to analyze and improve a hospital sterilization process. *Healthcare (Switzerland)*, *9*(5). https://doi.org/10.3390/healthcare9050544

[9] Kanyan, A., Ngana, S. C., & Voon, B. H. (2016). Australian contributions – Papers from CAUTHE fellows. *Journal of Hospitality and Tourism Management*, *26*, 82–83. https://doi.org/10.1016/j.jhtm.2016.01.001

[10] Kraiger, K., Passmore, J., Santos, N. R. dos, & Malvezzi, S. (Eds.). (2014). *The Wiley Blackwell Handbook of the Psychology of Training, Development, and Performance Improvement*. Wiley. https://doi.org/10.1002/9781118736982

[11] Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. *Personnel Psychology*, 281–342.

[12] Lee, H. J. (2022). A Study on the Effect of Customer Habits on Revisit Intention Focusing on Franchise Coffee Shops. *Information (Switzerland)*, *13*(2). https://doi.org/10.3390/info13020086

[13] Lee, J. C., Daraba, A., Voidarou, C., Rozos, G., Enshasy, H. A. El, & Varzakas, T. (2021). Implementation of Food Safety Management Systems along with Other Management Tools (HAZOP, FMEA, Ishikawa, Pareto). The Case Study of Listeria Monocytogenes and Correlation with Microbiological Criteria. *Foods*, *10*(9), 2169. https://doi.org/10.3390/foods10092169

[14] Liu, H.-C., Chen, X.-Q., Duan, C.-Y., & Wang, Y.-M. (2019). Failure mode and effect analysis using multi-criteria decision-making methods: A systematic literature review. *Computers & Industrial Engineering*, *135*, 881–897. https://doi.org/10.1016/j.cie.2019.06.055

[15] Armstrong, M., & Murlis, H. (2007). *Reward management: A handbook of remuneration strategy and practice* (5th ed.). Kogan Page.

[16] Miller, D. (2020). *Social media marketing, 3 books in one: Excellent tricks to grow your business, Instagram marketing to become a famous influencer, Tiktok and You Tube to make viral videos*. Independently Published.

[17] Nadiri, H., & Gunay, G. N. (2013). An empirical study to diagnose the outcomes of customers' experiences in trendy coffee shops. *Journal of Business Economics and Management*, *14*(1), 22–53. https://doi.org/10.3846/16111699.2011.631742

[18] Noe, R. A. (2010). *Employee Training and Development* (5th ed.). McGraw-Hill/Irwin.

[19] Salem, B. J., & Amraoui, E. L. (2016). Analysis of a Braking System based on Structured Analysis Methods. In *IJACSA) International Journal of Advanced Computer Science and Applications* (Vol. 7, Issue 2). www.ijacsa.thesai.org

[20] Swanson, L. (2001). Linking maintenance strategies to performance. *International Journal of Production Economics*, *70*(3), 237–244. https://doi.org/10.1016/S0925-5273(00)00067-0

[21] Zehir, C., Ertosun, Ö. G., Zehir, S., & Müceldilli, B. (2012). Total Quality Management Practices' Effects on Quality Performance and Innovative Performance. *Procedia - Social and Behavioral Sciences*, *41*, 273–280. https://doi.org/10.1016/j.sbspro.2012.04.031

[22] Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2009). *Services Marketing: Integrating Customer Focus Across the Firm* (5th ed.).

[23] Zhu, J., Liao, Z., Yam, K. C., & Johnson, R. E. (2018). Shared leadership: A state-of-the-art review and future research agenda. *Journal of Organizational Behavior*, *39*(7), 834–852. https://doi.org/10.1002/job.2296