

Quantitative Research Article

Factors Influencing Project Owner Satisfaction with Supervision Consultants in Public Building Projects

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Abstract. The construction supervision consultant is an appointed party responsible for overseeing the implementation of construction projects from start to finish. The satisfaction level of project owners with the consultant's performance is a key indicator of project success. This study aims to determine the level of satisfaction and key factors influencing it in public building projects. A quantitative method was employed by distributing questionnaires to respondents from the Public Works Office, particularly within the Cipta Karya Division in Tapin Regency, which serves as the case study location. Data were analyzed using the Customer Satisfaction Index (CSI) and Importance Performance Analysis (IPA) methods. The results showed that overall, the consultant's performance was rated as very satisfactory, with the highest CSI score on the communication indicator (86.64%) and the ability to ensure and improve work quality (85.33%). The lowest CSI score was found in the documentation/administration indicator (80.11%). Although the CSI score indicates a high level of satisfaction, there is still room for improvement, particularly in administrative aspects and understanding of technical regulations. The IPA analysis also shows that several indicators fall under top priority, such as documentation/administration, supervision, internal human resources, communication, and the ability to ensure and enhance work quality. The improvement strategies proposed include training, high discipline, and effective communication.

Keywords: Supervision Consultant, Improvement Strategy, Building Construction Project, Customer Sanitation Index, Importance Performance Analysis.

Introduction

Infrastructure development in the regions essentially plays a strategic role in supporting equitable national development, improving the quality of life of the community, and economic competitiveness. Building infrastructure, as an important part of physical development, not only functions as a means of public service, but also as a support for social, economic, and governmental activities. With the construction of office buildings, hospitals, and educational institutions, the community is expected to

have better access to health services, education, and government administration. This is in line with the government's efforts to create a livable, safe environment that supports sustainable growth in various sectors.

The Tapin Regency local government continues to encourage building infrastructure development to improve public services and support local economic growth [1]. Construction projects carried out include the construction of office buildings, educational facilities, and hospitals, involving various parties such as the local government, planning consultants, contractors, and supervisory consultants. Supervisory consultants play an important role in ensuring that the construction process complies with technical standards, ranging from material quality, work techniques, safety, to implementation documentation [2] [3]. In the 2023-2024 budget period, the Tapin Regency Public Works and Spatial Planning Agency's Cipta Karya Division recorded 17 construction activity packages.

However, based on interviews with the Tapin PUPR Agency and observations in the field, it was found that consultant supervision did not fully ensure the application of technical standards for building ventilation as stipulated in Government Regulation Number 16 of 2021 and SNI 03-6572-2001. Observations showed that there were rooms with ventilation less than 5% of the floor area, and some even had only 3% without cross ventilation. Of the 17 consultant supervision projects, 9 projects were found to be non-compliant with ventilation requirements, including a lack of technical correction documentation (interview with H. Noodhy Smith Sofian, S.T., July 10, 2025). Additionally, in terms of administration, 6 projects (35%) showed discrepancies between the experts and the contract, and 5 projects (29%) experienced delays in progress reporting, which could potentially disrupt project evaluation, fund disbursement, and accountability.

These problems caused project owners to be dissatisfied with the performance of the supervisory consultants, which was influenced by communication, understanding of needs, and the quality of work results [4]. Previous studies show that the performance of supervisory consultants in Banjarbaru during the COVID-19 pandemic received a satisfaction index of 83.10% in the "very satisfied" category [5] [6]. The difference in this study lies in the object and respondents, namely the satisfaction of project owners with the supervision of building construction in Tapin Regency. Considering that there are still many technical and administrative problems, it is important to analyze the satisfaction of project owners with the performance of supervisory consultants at the Tapin Regency PUPR Office so that the quality, time, and cost of the project can be maintained.

1. Literature Review

1.1. Construction Projects

In a construction project, there are three main aspects that must be considered, namely time, cost, and quality, so that proper construction management is required from the planning, tendering, implementation, to post-implementation stages so that the project runs smoothly [7]. A construction project itself is a collection of interrelated activities with the aim of producing a building within a certain time frame, cost, and quality, which requires various resources in the form of people, materials, equipment, methods, money, information, and time[8][9]. The project implementers consist of the

owner, planning consultant, supervisory consultant, and contractor, who must have good coordination in order to achieve project success [10]. The project owner, whether it be the government, a company, a private entity, or an individual, has the obligation to provide funds, administration, assign tasks, hold consultants accountable, and accept the completed project, with the authority to draft work orders (SPK), approve or reject changes to the work, and hold the contractor accountable for the construction results [11].

1.2. Building Infrastructure

According to Government Regulation of the Republic of Indonesia Number 36 of 2005 concerning the Implementation Regulations of Law Number 28 of 2002 concerning Buildings, 2005, a building is a physical form resulting from construction work that is integrated with its location, whether on land or in water, which functions as a place for humans to carry out various activities, such as residential, business, social, cultural, or other special activities [12]. The management of buildings includes construction, utilization, preservation, and demolition, even from the planning stage to realize buildings according to needs. The functions of buildings according to these regulations include residential functions (single-family homes, row houses, apartment buildings, or temporary housing), religious functions (mosques, prayer rooms, churches, chapels, temples, monasteries, and shrines), business functions (offices, trade, industry, hotels, tourism, terminals, and storage), as well as social and cultural functions used for various community activities. Building reliability, according to the Big Indonesian Dictionary (KBBI), is the level of perfection of a building and its facilities to ensure safety, function, and comfort during its useful life, while according to Minister of Public Works Regulation No. 29/PRT/M/2006, reliability is the fulfillment of safety, health, comfort, and convenience requirements in accordance with the needs of the building's function [13]. Furthermore, in the KBBI, "suitable" means meeting the specified requirements, so that the suitability of a building is a condition that meets government requirements to be used safely and comfortably. Government Regulation No. 36 of 2005 stipulates that every building must be functionally suitable, i.e., it must meet the administrative and technical requirements in accordance with its designated function [12].

1.3. Consultancy Services Companies

According to Presidential Regulation of the Republic of Indonesia Number 12 of 2021 concerning Amendments to Presidential Regulation Number 16 of 2018 concerning Government Procurement of Goods/Services, Consulting Services are professional services that require specific expertise in various scientific fields with an emphasis on critical thinking [14]. In the Minister of Public Works Regulation No. 08/PRT/M/2011 concerning the Division of Subclassifications and Subqualifications of Construction Services Businesses, construction supervisors are described as service providers, both individuals and business entities, who are experts in the field of construction service supervision and are capable of carrying out work until completion and handover[15]. Achieving construction quality in accordance with the plan is greatly influenced by management in the field, so it is necessary to have consultants who work professionally [16][17]. The role of supervisory consultants includes planning (selecting technology, methods, and controlling changes), control (supervising project activities, workers, equipment, and methods), and evaluation (monitoring, reporting, and evaluating whether

implementation is according to plan)[18][19]. In terms of service quality, supervisory consultants are required to pay attention to five dimensions, namely tangibles (physical evidence), reliability, responsiveness, assurance (guarantee/trust), and empathy (personal attention), so that the satisfaction of the project owner can be achieved [20].

1.4. Customer Satisfaction

Customer satisfaction is an expression of pleasure or disappointment that arises after comparing the perceived results with the desired expectations of a product or service[21][22][23]. Consumer dissatisfaction occurs when the service results do not meet expectations, which can have a negative impact on the success of the service [24][25]. Expectations are formed from experience, comments, and competitor information, while perceptions reflect the company's ability to provide satisfactory service. To measure customer satisfaction, there are four methods namely a complaint and suggestion system through suggestion boxes, comment cards, or toll-free telephone numbers; ghost shopping by hiring external parties to pretend to be customers; lost customer analysis by contacting customers who have stopped buying; and customer satisfaction surveys, both directly and online, with several approaches such as directly reported satisfaction, derived satisfaction (comparison between expectations and perceived performance), problem analysis (identifying problems and suggestions for improvement), and importance-performance analysis (analyzing the level of importance of attributes and company performance in a matrix to direct improvements that have a big impact) [26].

1.5. Performance

Performance is a set of results achieved and refers to the actions taken to achieve and carry out a job in accordance with predetermined targets [27], [28]. To complete a job, a person not only needs skills and willingness, but also a clear understanding of what the task is and how it should be done[29] [30]. The performance of consultants is the work results achieved based on competence, experience, sincerity, and timeliness, which are benchmarks for determining the level of achievement of an agency and the impact of its operations [17] [31]. Consultant performance is influenced by the ability to work according to specifications, procedures, communication, interpersonal skills, teamwork, initiative, work knowledge, professionalism, analytical skills, productivity, and leadership [30]. Meanwhile, emphasizes that employee or staff performance is influenced by three main factors, namely individual factors (ability, skills, motivation, and work ethic), organizational support factors (organization, facilities and infrastructure, as well as clear and comfortable working conditions), and management support factors (managerial ability of leaders in building work systems, harmonious industrial relations, competency development, and employee motivation to work optimally)[32][32][33].

2. Methodology

2.1. Research Design and Workflow

This study uses a quantitative design to evaluate project owners' satisfaction with the performance of supervisory consultants in public building projects, using Tapin Regency as the case study location (2023–2024). The entire flow of this study is as follows:

1. Preliminary Study
Identification of problems, objectives, and context of supervision practices in public building projects.
2. Literature Review
Synthesis of theories, regulations, and research findings to develop an analytical framework.
3. Determination of Variables & Indicators
Determination of indicators: administration, supervision, internal quality of human resources, communication, and the ability to guarantee & improve quality.
4. Data Collection
Questionnaires, interviews, observations, and supporting documents (literature, contracts, project documentation).
5. Instrument Testing
Testing validity and reliability (internal consistency).
6. CSI Analysis
Calculation of MIS, MSS, WF, WS, and Customer Satisfaction Index scores for total satisfaction and per indicator.
7. IPA Analysis
Mapping of importance (Y) vs. performance (X) on a Cartesian diagram to determine priority quadrants.
8. Strategy Formulation
Integration of CSI and IPA results into performance improvement recommendations for supervisory consultants and agencies.
9. Conclusion
Summary of findings, practical implications, and recommendations for follow-up.

2.2. Case Study

This case study focuses on building projects managed by the Cipta Karya Division of the Tapin Regency Public Works and Spatial Planning Office in the 2023–2024 fiscal year. There are 17 work packages (including offices, health facilities, and educational buildings) with Cipta Karya acting as the representative of the project owner responsible for the scope, cost control, and technical acceptance. The performance of the supervisory consultant was evaluated within the regulatory framework of Government Regulation No. 16/2021 and SNI 03-6572-2001, with recurring operational issues as documented by the owner, such as suboptimal natural ventilation design (e.g., effective opening area below 5% of floor area and absence of cross ventilation), mismatched qualifications of experts, and

delays in progress reporting. The unit of analysis is supervision services at the package level, while the evaluation domain covers five dimensions that reflect the owner's expectations: (i) documentation/administration, (ii) supervision of resources, time, costs, and quality, (iii) internal quality of the consultant team's human resources, (iv) communication and coordination of stakeholders, and (v) the ability to ensure and improve quality through corrective and preventive actions. The purpose of the case study is to quantify owner satisfaction in each dimension and map priority areas for improvement in order to increase the suitability, timeliness, and value of results in subsequent Tapin building projects.

2.3. Data Collection

Data collection in this study was conducted through questionnaires, interviews, observations, and documentation. Questionnaires were used to obtain primary data on respondents' perceptions and satisfaction levels regarding the performance of supervisory consultants, using instruments that had been tested for validity and reliability[35]. Semi-structured interviews were conducted with three key informants representing the project owner's side, namely the Commitment Making Official (PPK), the Head of the Building and Settlement Section, and the Field Supervisor, to obtain complementary information on project supervision practices, technical challenges, and improvement strategies. Field observations were also carried out to directly observe on-site supervision activities, while secondary data were collected from supporting documents such as the terms of reference, contract quality plans, activity reports, and project documentation, which served as verification material and strengthened the analytical findings.

2.4. Participants

The participants in this study were project owners and related parties directly involved in the implementation of construction activities in the Cipta Karya Division of the Tapin Regency Public Works and Spatial Planning Office for the 2023 and 2024 fiscal years. Respondents consisted of Budget Users (PA), Commitment Making Officials (PPK), Technical Activity Implementation Officials (PPTK), Head of the Cipta Karya Division, Head of the Building and Settlement Section, Field Supervisors, Technical Managers, the Work Results Acceptance Committee Team (PPHP), and contractors for physical activities in the Cipta Karya field. The total number of respondents was 39 people, representing the important roles of each in the process of supervising and implementing building construction projects.

2.5. Data Analysis

2.5.1. Satisfaction Level Analysis

The satisfaction level analysis of the supervisory consultant's performance was conducted using the Customer Satisfaction Index (CSI) method. This method considers the level of importance and satisfaction of each indicator measured through the respondent questionnaire. The calculation steps include determining the Mean Importance Score (MIS) and Mean Satisfaction Score (MSS), determining the Weight Factor (WF) by comparing the MIS of each indicator to the total MIS, and determining the Weight Score (WS) obtained from the multiplication of MSS and WF. The WS value shows the

contribution of each indicator to the total satisfaction of the project owner. Next, the CSI value is calculated and categorized into five levels of satisfaction, namely very satisfied (80–100%), satisfied (65–79.99%), fairly satisfied (50–64.99%), dissatisfied (35–49.99%), and very dissatisfied (0–34.99%).

2.5.2. Priority Factor Analysis

Priority factor analysis was conducted using the Importance Performance Analysis (IPA) method, which maps the relationship between the level of importance (expectations) and the actual performance level of the supervisory consultant. The results of the questionnaire processing are illustrated in a two-dimensional quadrant diagram, with the X-axis representing actual performance and the Y-axis representing importance. The resulting factors are divided into four quadrants, namely Concentrate Here (top priority), Keep up the Good Work (maintain performance), Low Priority, and Possibly Overkill. This analysis provides a clear picture of the aspects of supervisory consultant performance that need to be improved, the factors that must be maintained, and strategies for improving performance. The main outputs are a satisfaction index, priority improvement factors, improvement strategies, and recommendations for the Tapin District PUPR Office in improving building project supervision.

3. Results and discussion

3.1. Research Results

Based on the validity test results using Spearman's rank, all items in the performance level variable (X), which includes indicators of administration, supervision, human resources, communication, and work quality, as well as the expectation level variable (Y) with the same indicators, are declared valid because they have a Sig. (1-tailed) value ≤ 0.05 . Furthermore, the reliability test results showed that all research instruments were reliable because the Cronbach's Alpha value exceeded 0.6 as the minimum limit. Thus, the questionnaire used in this study was declared valid and reliable, making it suitable for use as an instrument for data collection and further analysis. To provide a clearer overview of the comparison between the actual performance and the expectations of project owners toward supervisory consultants, the results of the analysis are summarized in the following table.

| No. | Indicator | Mean | C-Line | Mean | C-Line | Interpretation |
|-----|--|-------------|--------|-------------|--------|--|
| | | Performance | | Expectation | | |
| 1 | Administration / Documentation | 4.03 | 4.01 | 4.56 | 4.51 | Good performance but slightly below owner's expectations. |
| 2 | Supervision (Resources, Time, Cost, Quality) | 4.26 | 4.19 | 4.64 | 4.63 | Strong supervision quality; expectations remain higher. |
| 3 | Internal Human Resource Quality | 4.15 | 4.00 | 4.51 | 4.58 | Competent HR, though improvement in technical consistency is expected. |
| 4 | Communication and Coordination | 4.46 | 4.33 | 4.56 | 4.49 | Excellent communication; nearly aligns with expectations. |
| 5 | Ensuring and Improving Work Quality | 4.31 | 4.27 | 4.72 | 4.69 | High performance, but still room for quality enhancement. |

Table 1. Analysis of Consultant Performance and Expectations Based on Respondents' Perceptions

Source: Processed Data (2025)

Based on Table 1, the analysis shows that supervisory consultants are generally rated as performing well across all evaluated indicators, reflecting satisfactory implementation of administrative, supervisory, and communication functions. However, the consistently higher expectation scores from project owners indicate a gap between perceived performance and desired standards, emphasizing the need for continuous improvement in supervision quality, responsiveness, and adherence to technical and administrative requirements to achieve optimal satisfaction levels.

3.2. Performance Analysis of Supervisory Consultants in Building Infrastructure Construction in Tapin Regency for Fiscal Years 2023 and 2024

3.2.1. Analysis Customer Satisfaction Index (CSI)

Based on the results of the Customer Satisfaction Index (CSI) analysis of the performance of supervisory consultants on building infrastructure construction projects in Tapin Regency for the 2023–2024 fiscal year, this study assessed five main variables, namely documents/administration, supervision, capability, communication, and work quality. The analysis was conducted using SPSS statistical software and Microsoft Excel as the basis for assessing the respondents' level of satisfaction with the performance of the supervisory consultants.

| Questionnaire (Code) | Mean Importance Score | Weight Factor | Mean Satisfaction Score | Weight Score |
|--|-----------------------|---------------|-------------------------|--------------|
| Expert Qualification Documents (D1) | 4.56 | 25.28 | 4.03 | 101.78 |
| Response to Construction Implementation Quality Plan and Technical Specifications (D2) | 4.51 | 25.00 | 4.03 | 100.64 |
| Progress Reports and Supervision Activity Results (D3) | 4.59 | 25.43 | 3.90 | 99.10 |
| Handover Process for Work Results (D4) | 4.38 | 24.29 | 4.08 | 99.03 |
| Total | 18.05 | 100.00 | 16.03 | |
| Weight Total | | | | 400.55 |
| CSI | | | | 80.11 |

Table 2. Analysis of Customer Satisfaction Index (CSI) on Document/Administration Indicators

Source: Processed Data (2025)

Based on Table 1, the Customer Satisfaction Index (CSI) for the document/administration indicator was 80.11%, which falls into the "Satisfied" category. The Progress Reports and Supervision Activity Results indicator had the highest Weight Factor of 25.43, but the satisfaction level was relatively low with a Mean Satisfaction Score of 3.90 and a Weight Score of 99.10, indicating that improvements are still needed. In contrast, the Expert Qualification Documents indicator had a Weight Factor of 25.28, a Mean Satisfaction Score of 4.03, and a Weight Score of 101.78, indicating a better level of satisfaction. Meanwhile, the Handover Process for Work Results recorded the lowest Weight Score of 99.03, indicating that respondents perceived this aspect to be the least satisfactory among the evaluated administrative factors.

| Questionnaire (Code) | Mean Importance Score | Weight Factor | Mean Satisfaction Score | Weight Score |
|--|-----------------------|---------------|-------------------------|--------------|
| Supervision and Control of Resources (P1) | 4.64 | 20.07 | 4.26 | 85.41 |
| Supervision of Quality Compliance and Construction Implementation Methods (P2) | 4.49 | 19.40 | 4.21 | 81.59 |
| Supervision of Work Time and Progress (P3) | 4.72 | 20.40 | 4.21 | 85.78 |
| Project Cost Supervision (P4) | 4.64 | 20.07 | 4.28 | 85.93 |
| Implementation of Occupational Health and Safety Management Systems in Projects (P5) | 4.64 | 20.07 | 4.03 | 80.78 |
| Total | 23.13 | 100.00 | 20.97 | |
| Weight Total | | | | 419.48 |
| CSI | | | | 83.90 |

Table 3. Analysis of Customer Satisfaction Index (CSI) on Supervision Indicators

Source: Processed Data (2025)

Based on Table 2, the Customer Satisfaction Index (CSI) for the supervision indicator reached 83.90%, which is categorized as "Very Satisfied." Although the overall performance appears strong, 16.10% of respondents still expressed dissatisfaction, indicating that several aspects require improvement. The highest satisfaction level was observed in the indicator related to project cost supervision, which recorded a Weight Score of 85.93, demonstrating effective cost management performance. Meanwhile, the lowest satisfaction level was found in the indicator related to the implementation of the Occupational Health and Safety Management System, which obtained a Weight Score of 80.78, indicating the need for a more consistent and comprehensive application of safety standards throughout project execution.

| Questionnaire (Code) | Mean Importance Score | Weight Factor | Mean Satisfaction Score | Weight Score |
|---|-----------------------|---------------|-------------------------|--------------|
| Expert Consultant in Their Field (S1) | 4.59 | 25.07 | 4.15 | 104.14 |
| Comprehensive Understanding of Construction Implementation Documents (S2) | 4.59 | 25.07 | 4.03 | 100.92 |
| Cooperative in Decision Making (S3) | 4.51 | 24.65 | 4.15 | 102.39 |
| Understanding of the Latest Construction Regulations (S4) | 4.62 | 25.21 | 3.90 | 98.25 |
| Total | 18.31 | 100.00 | 16.23 | |
| Weight Total | | | | 405.70 |
| CSI | | | | 81.14 |

Table 4. Analysis of Customer Satisfaction Index (CSI) on Internal Human Resource Quality Indicators

Source: Processed Data (2025)

Based on Table 3, the Customer Satisfaction Index (CSI) for the internal human resource quality indicator reached 81.14%, which is categorized as "Very Satisfied." However, 18.86% of respondents still expressed dissatisfaction, indicating the need for continuous performance improvement. The highest satisfaction level was recorded in the indicator related to supervisory consultants who are

experts in their field, which achieved a Weight Score of 104.14, reflecting strong professional competency. Meanwhile, the lowest score was found in the indicator related to understanding the latest construction regulations, which obtained a Weight Score of 98.25, suggesting that increased training and updates on current regulations are necessary to ensure better compliance and technical accuracy in project supervision.

| Questionnaire (Code) | Mean Importance Score | Weight Factor | Mean Satisfaction Score | Weight Score |
|---|-----------------------|---------------|-------------------------|--------------|
| Open to Constructive Feedback (K1) | 4.56 | 14.52 | 4.46 | 64.79 |
| Providing Consultation Services During the Project (K2) | 4.54 | 14.44 | 4.26 | 61.46 |
| Providing Suggestions for Changes in Scope (Materials/Methods) (K3) | 4.54 | 14.44 | 4.10 | 59.24 |
| Explaining the Scope and Specifications Clearly (K4) | 4.56 | 14.52 | 4.41 | 64.04 |
| Communicating the Owner's Needs Quickly and Accurately (K5) | 4.62 | 14.68 | 4.38 | 64.39 |
| Coordinating with All Stakeholders (K6) | 4.51 | 14.36 | 4.36 | 62.59 |
| Handling Problems/Complaints from Within and Outside the Project (K7) | 4.10 | 13.03 | 4.35 | 56.70 |
| Total | 31.43 | 100.00 | 17.23 | |
| Weight Total | | | | 433.21 |
| CSI | | | | 86.64 |

Table 5. Analysis of Customer Satisfaction Index (CSI) on Communication Indicators
Source: Processed Data (2025)

Based on Table 4, the Customer Satisfaction Index (CSI) for the communication indicator reached 86.64%, which is categorized as "Very Satisfied." This strong performance indicates that communication between the supervisory consultant and project stakeholders has generally been effective, although 13.95% of respondents still expressed dissatisfaction. The highest satisfaction level was observed in the indicator measuring the consultant's ability to be open to constructive feedback, which achieved a Weight Score of 64.79. Conversely, the lowest satisfaction level was recorded in the indicator related to handling complaints from both internal and external project parties, which obtained a Weight Score of 56.70. This finding suggests that while the overall communication competency is strong, the responsiveness and effectiveness in resolving emerging issues still require improvement to ensure optimal project supervision.

| Questionnaire (Code) | Mean Importance Score | Weight Factor | Mean Satisfaction Score | Weight Score |
|---|-----------------------|---------------|-------------------------|--------------|
| Shop Drawing Inspection and Approval (M1) | 4.72 | 16.77 | 4.31 | 72.25 |
| Damage/Error Detection and Repair (M2) | 4.69 | 16.68 | 4.33 | 72.29 |
| Project Analysis and Data Collection Activity Identification (M3) | 4.62 | 16.41 | 4.33 | 71.10 |
| Implementation Method Evaluation and Approval (M4) | 4.69 | 16.68 | 4.28 | 71.43 |

| Questionnaire (Code) | Mean Importance Score | Weight Factor | Mean Satisfaction Score | Weight Score |
|---------------------------------------|-----------------------|---------------|-------------------------|--------------|
| Latest Regulation Implementation (M5) | 4.72 | 16.77 | 4.08 | 68.38 |
| Total | 23.44 | 100.00 | 21.33 | |
| Weight Total | | | | 426.63 |
| CSI | | | | 85.33 |

Table 6. Analysis of Customer Satisfaction Index (CSI) on the Ability to Guarantee and Improve Work Quality Indicators

Source: Processed Data (2025)

Based on Table 5, the Customer Satisfaction Index (CSI) for the indicator of the ability to guarantee and improve work quality reached 85.33%, which falls into the “Very Satisfied” category. However, 14.67% of respondents still indicated dissatisfaction, suggesting that performance enhancements remain necessary. The highest satisfaction level was observed in the indicator related to damage/error detection and repair, achieving a Weight Score of 72.29, reflecting strong responsiveness in correcting field issues. Meanwhile, the lowest satisfaction level was recorded in the indicator measuring the implementation of the latest regulations, with a Weight Score of 68.38, indicating that continuous updating of technical knowledge and regulatory compliance should be prioritized to enhance supervision effectiveness.

The Customer Satisfaction Index (CSI) results show that the level of respondent satisfaction is in the “Very Satisfied” category, but there are still gaps that need to be addressed, particularly in the indicators of documentation/administration (80.11% with a gap of 19.89%), internal quality of human resources (81.14% with a gap of 18.86%), and the ability to guarantee and improve work quality (85.33% with a gap of 14.67%). These findings are reinforced by the results of technical observations in the field, which show that 9 out of 17 projects (53%) do not fully comply with the ventilation requirements in Government Regulation No. 16 of 2021 and SNI 03-6572-2001, for example, ventilation openings are less than 5%, there is no cross ventilation, and the ventilation design is not optimal. The difference between the CSI results and field observations is not contradictory, but rather shows that the CSI approach reflects the subjective perceptions of respondents, while field observations are objective and based on direct measurements. Thus, these technical results complement and reinforce the fact that supervision performance still needs improvement, especially in understanding technical regulations and their application in the field, so that satisfaction can truly reach an optimal level.

3.2.2. Analysis Importance Performance Analysis (IPA)

This study uses the Importance Performance Analysis (IPA) method to assess the extent to which supervisory consultants in the Cipta Karya Division of the Tapin Regency Public Works and Spatial Planning Office are able to fulfill important aspects according to respondents. Through a Likert scale-based questionnaire, data was obtained quantitatively, then the average score for each indicator was calculated and mapped into a Cartesian quadrant diagram separated by the X and Y axes (C-Line). This approach facilitates the identification of priorities for improvement or strengthening based on the alignment between the level of importance and actual performance, so that the indicators that most influence the performance of supervisory consultants can be analyzed in a more targeted manner using Microsoft Excel.

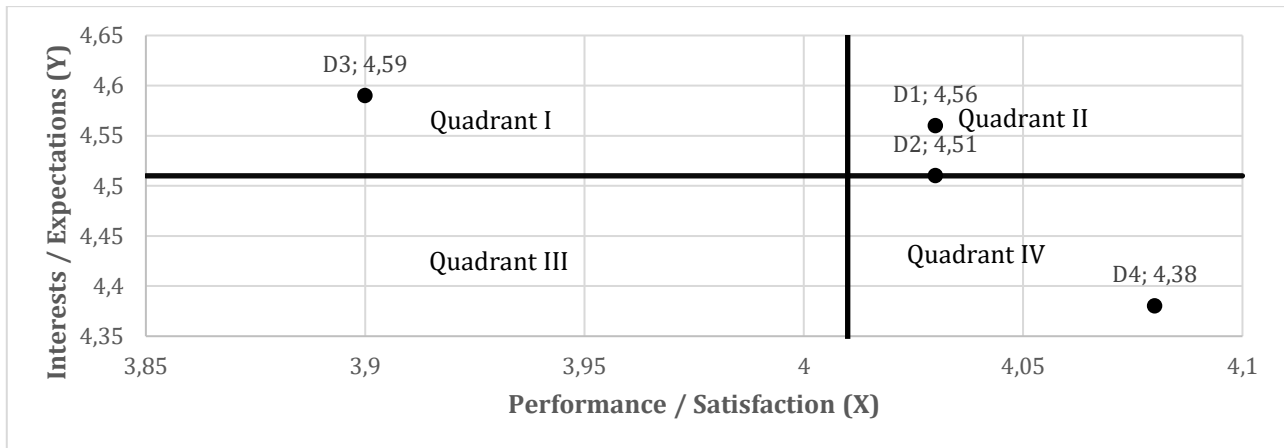


Figure 1. Cartesian Importance Performance Analysis (IPA) Diagram of Document/Administration Indicators
Source: Processed Data (2025)

Based on the analysis in Figure 1, document/administration indicators are divided into four quadrants of Importance Performance Analysis (IPA). Quadrant I (Top Priority) contains variables related to reporting and evaluating work progress during the project, which are very important but whose performance is not yet optimal and therefore needs to be improved immediately. Quadrant II (Maintain Performance) covers the accuracy of expert qualification documents and responses to RMPK and technical specifications, which have been assessed as good and need to be maintained consistently. There are no variables in Quadrant III (Low Priority), while Quadrant IV (Excessive) is filled with work handover processes that perform well but are of relatively low importance. These results confirm that the main focus of improvement lies in the reporting and evaluation of activities, while other variables can be maintained according to their level of importance.

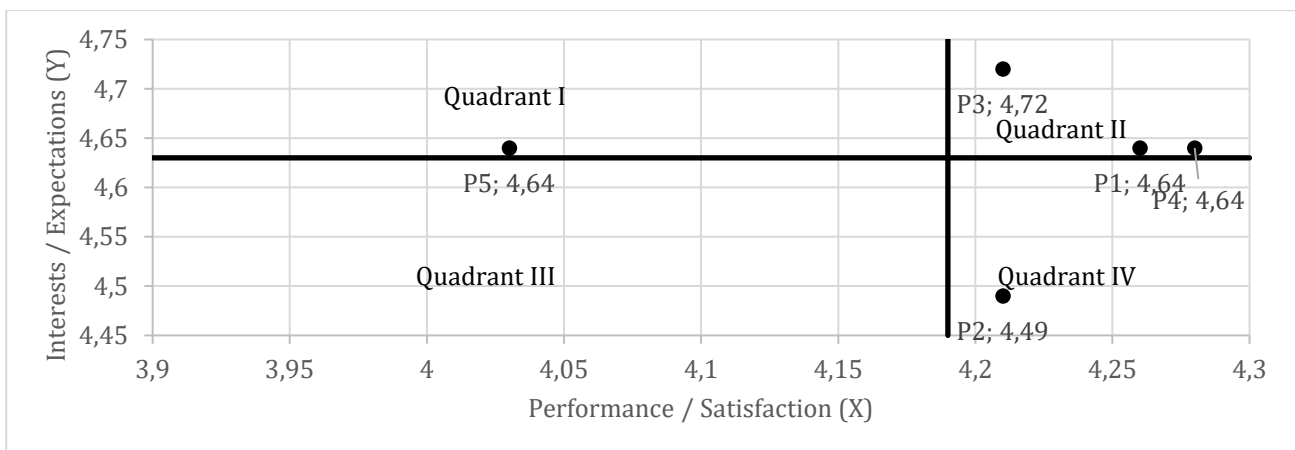


Figure 2. Cartesian Importance-Performance Analysis (IPA) Diagram of Supervision Indicators
Source: Processed Data (2025)

Based on the analysis in Figure 2, the monitoring indicators are divided into four quadrants of Importance Performance Analysis (IPA). Quadrant I (High Priority) contains variables related to the implementation of occupational health and safety management systems in projects, which are considered very important but whose performance is not yet optimal, thus requiring immediate attention and improvement. Quadrant II (Maintain Performance) includes three variables, namely supervision and control of project resources, supervision of the conformity of specifications and quality

of construction, and supervision of work time and progress, whose performance is already good and therefore needs to be maintained consistently. There are no variables in Quadrant III (Low Priority), while Quadrant IV (Excessive) is filled with project cost supervision, which is considered to have excellent performance but a relatively lower level of importance. Thus, the main focus of supervision improvement lies in the implementation of occupational health and safety management systems, while other variables are maintained according to their level of importance.

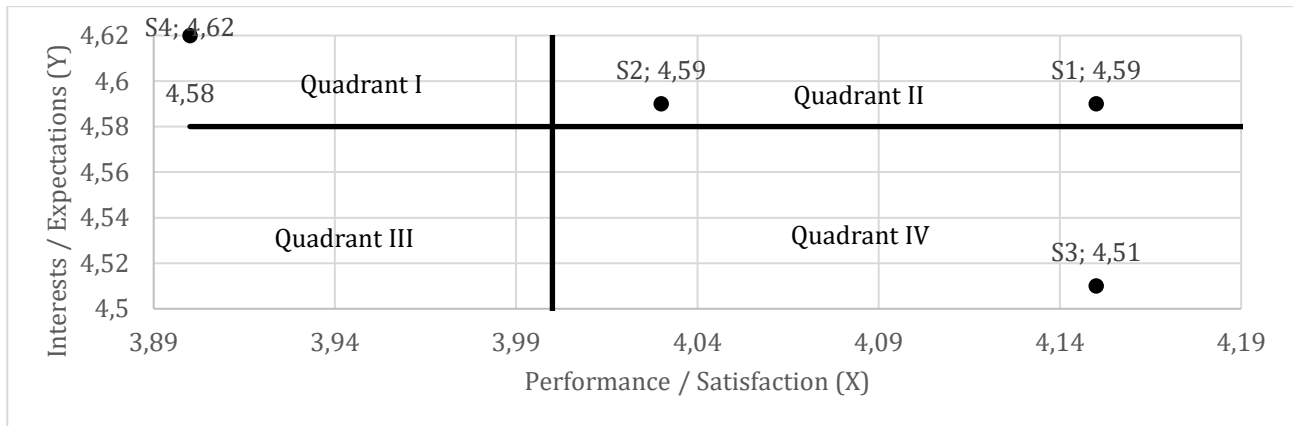


Figure 3. Cartesian Importance-Performance Analysis (IPA) Diagram of Quality Indicators
Source: Processed Data (2025)

Based on the analysis in Figure 3, internal human resource quality indicators are divided into four Importance Performance Analysis (IPA) quadrants. Quadrant I (High Priority) contains the variable of understanding the latest regulations for construction implementation, which is considered very important but whose performance is not yet optimal and therefore requires special attention for improvement. Quadrant II (Maintain Performance) includes two variables, namely supervisory consultants who are experts in their fields and a comprehensive understanding of construction implementation documents, which have shown good performance and must be maintained. No variables fall into Quadrant III (Low Priority), while Quadrant IV (Excessive) is filled by the variable of being cooperative in every action and decision-making, which has excellent performance but a relatively lower level of importance. Thus, the main priority for improving the quality of internal human resources lies in understanding the latest regulations, while other variables should be maintained consistently according to their level of importance.

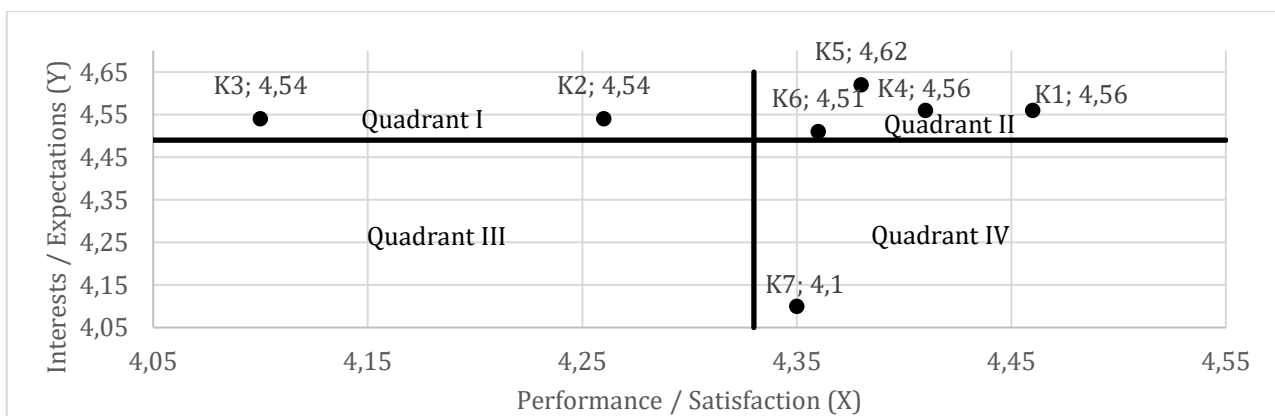


Figure 4. Cartesian Importance-Performance Analysis (IPA) Diagram of Communication Indicators
Source: Processed Data (2025)

Based on the analysis in Figure 4, communication indicators are divided into four quadrants of Importance Performance Analysis (IPA). In Quadrant I (High Priority), there are two variables, namely the ability to provide consultation services at any time to all project stakeholders and the ability to provide suggestions for better changes in scope (materials and implementation methods) if necessary. These two aspects are considered very important but their performance is not yet optimal, so they require serious attention for improvement. Quadrant II (Maintain Performance) includes four variables, namely the ability to be open and accept constructive input, the ability to explain work limitations and scope of work well, the ability to understand and convey the owner's needs quickly and accurately, and the ability to coordinate with all project stakeholders. These four variables have shown good performance, so consistency needs to be maintained. There are no variables in Quadrant III (Low Priority), while Quadrant IV (Excessive) is filled with the ability to prevent, reduce, or resolve any problems or complaints, which is considered to have high performance but a relatively lower level of importance. Thus, the main priority for improving the communication of supervisory consultants lies in providing readily available consulting services and the ability to provide innovative and relevant technical advice.

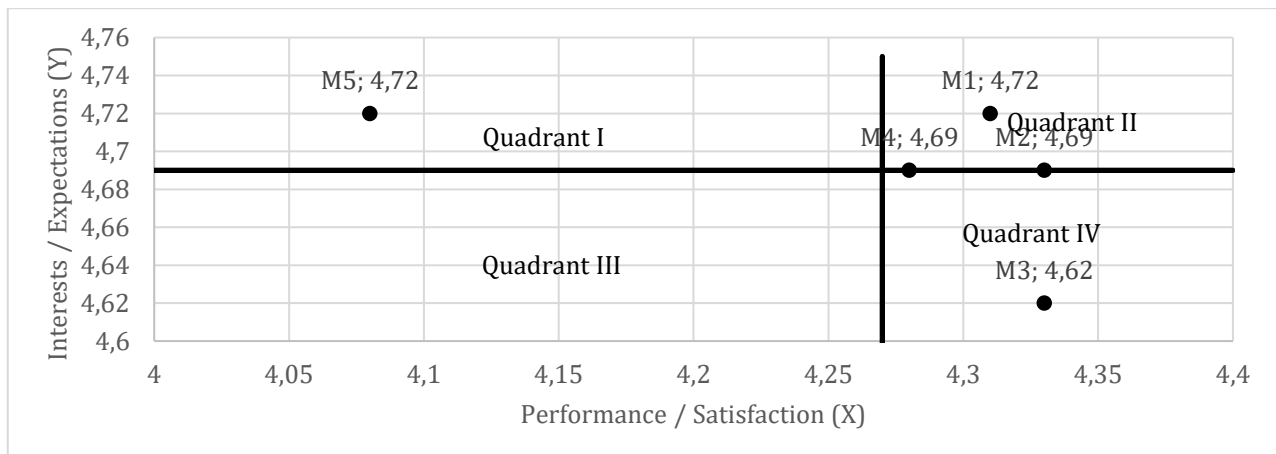


Figure 5. Cartesian Importance-Performance Analysis (IPA) Diagram of Indicators Related to the Ability to Ensure and Improve Work Quality

Source: Processed Data (2025)

Based on the analysis results in Figure 5, indicators of the ability to guarantee and improve work quality are divided into four quadrants of Importance Performance Analysis (IPA). In Quadrant I (Top Priority), there is one variable that must be given primary attention, namely the ability to implement the latest regulations. This aspect is considered very important, but its performance is still low, requiring immediate improvement. Quadrant II (Maintain Performance) includes three variables, namely the ability to inspect, correct, and approve every work implementation (shop drawings) submitted by the construction contractor; the ability to detect and provide repairs for damage or errors; and the ability to review and approve interpretations and evaluations of construction work methods. These three variables have shown good performance and therefore need to be maintained. There are no variables in Quadrant III (Low Priority), while Quadrant IV (Excessive) contains one variable, namely the ability to identify project analysis and data collection activities, which are assessed as having high performance but relatively lower importance. Thus, the priority for improvement lies in strengthening the

supervisory consultant's ability to implement the latest regulations so that the quality of work can be optimally guaranteed.

Based on the results of the Importance Performance Analysis (IPA) in Tables IV.31 to IV.35, it is known that the variables of the supervisory consultant's work are divided into four quadrants with a fairly clear distribution. There are 6 variables in Quadrant I (Concentrate Here) as the main priority for improvement, 14 variables are in Quadrant II (Keep Up the Good Work) which already perform well and need to be maintained, no variables are in Quadrant III (Low Priority), and 5 variables in Quadrant IV (Possibly Overkill) which show high performance even though their level of importance is relatively low.

The six variables in Quadrant I come from five main indicators, namely documents/administration, supervision, internal HR quality, communication, and the ability to guarantee and improve work quality. In detail, these variables include reporting and evaluating work progress during the project (D3), the implementation of occupational health and safety management systems in projects (P5), understanding of the latest regulations for construction implementation (S4), the ability to provide consultation services at any time to all project stakeholders (K2), the ability to provide advice on scope changes (K3), and the ability to implement the latest regulations (M5). These variables must be the main focus of improvement because they are considered very important but their performance is not yet optimal, so serious handling is needed to improve the performance of supervisory consultants in the Cipta Karya Division of the Tapin Regency Public Works and Spatial Planning Office.

3.3. Performance Improvement Strategy

Based on the results of the Importance Performance Analysis (IPA), there are five main indicators that fall into Quadrant I (Concentrate Here), namely indicators that are very important but still show low performance. These indicators include documents/administration related to project activity reporting and evaluation, supervision related to the implementation of occupational health and safety management systems, internal human resource quality covering understanding of the latest regulations, communication related to on-demand consulting services and providing advice on scope changes, and the ability to guarantee and improve work quality through the implementation of the latest regulations.

Interviews with Commitment Making Officials (PPK) reinforced the IPA's findings. Several issues were identified, including delays in project progress reports, suboptimal implementation of occupational health and safety management systems, supervisory consultants still using outdated regulations due to lack of socialization, limited experts to provide multi-project consultation, and low access to information on innovative materials and construction methods. These conditions indicate a significant gap between the expectations of project owners and the actual performance of supervisory consultants in the field.

Improvement strategies are directed at enhancing administrative quality, strengthening the implementation of occupational health and safety management systems, increasing human resource capacity, optimizing communication, and ensuring compliance with the latest regulations. Some recommended steps include appointing dedicated administrative personnel for reporting, implementing a cloud-based digital system, developing a health and safety management system checklist, educating personnel on the use of personal protective equipment, and providing regular

technical training to understand the latest regulations. In addition, there is a need for an internal discussion forum as a means of aligning understanding among consultant personnel.

Other efforts that can be made include developing an online communication system through work groups or project dashboards to accelerate coordination, implementing scheduled or rotating consulting services to overcome limitations in expert personnel, and increasing access to journals, professional platforms, and digital regulations so that consultants can always keep up with the latest developments. The development of practical internal guidelines on regulations and periodic compliance evaluations is also important to prevent technical errors. With the implementation of these strategies, it is hoped that the indicators currently in Quadrant I will move to Quadrant II, which is the category of important factors with good performance.

3.4. Discussion

The results of this study are similar to various previous studies that assessed the performance of construction supervision consultants in public infrastructure projects. In general, the level of satisfaction among respondents was in the high category ("satisfied" to "very satisfied"), indicating a positive perception of the performance of supervision and the quality of work. This is in line with the results of a study in Ternate City, which showed a CSI value of 83.10% and was categorized as very satisfied [6], as well as a study in Banjarbaru, which also showed a high level of satisfaction with the aspects of administration, supervision, and technical capabilities [5]. Similar findings were also obtained in studies on road and health facility projects, where the dominant factors affecting satisfaction were quality control and work timeliness [31] [4]. Thus, the results of this study reinforce the view that the quality of supervision and compliance with technical specifications are the main factors in determining the level of satisfaction with the performance of supervisory consultants [36].

This study differs from most previous studies, which only used a descriptive approach or focused on one type of project, such as roads or health buildings. The combined approach of the Customer Satisfaction Index (CSI) and Importance Performance Analysis (IPA) in building projects under the Cipta Karya Division produced a more in-depth and measurable analysis. The focus of this study is not only on technical aspects but also on administrative, regulatory, and communication dimensions, such as progress reporting, implementation of the occupational safety and health management system, and the ability to provide ongoing consulting services. This approach provides a broader perspective compared to previous studies that placed quality as the only dominant factor [4][18][31]. In addition, this study also conducted direct observations in the field to assess compliance with technical standards such as PP 16/2021 and SNI 03-6572-2001, which have not been explicitly described in similar [5] [30].

The main strength of this study lies in the use of a combined CSI and IPA method that can specifically identify priority factors that need to be improved by supervisory consultants. Five key indicators namely administration, supervision, human resource quality, communication, and the ability to guarantee and improve quality were analyzed simultaneously to produce operational and applicable recommendations. These findings are more comprehensive than previous studies that only highlighted one or two indicators [18] [29]. This study also has strength in empirical validation through direct interviews with Commitment Making Officials (PPK), so that the resulting strategies, such as digitization of reporting, preparation of K3 checklists, and the establishment of a repository of the latest regulations,

have practical relevance in the field. In addition, the integration of questionnaire data, observations, and supporting documents makes the results of this study more applicable and contributes significantly to improving the performance of supervisory consultants [36].

This study has several limitations that need to be considered when interpreting the results. First, the scope of the study was limited to building projects in Tapin Regency, so the results cannot be generalized to other regions or different types of projects. Second, the cross-sectional design of the study and the respondents' perceptions did not explain the causal relationship between variables, so a more in-depth follow-up approach, such as longitudinal analysis or structural equation modeling, is still needed. Third, the relatively small number of respondents limits the strength of statistical inference to a broader population. In addition, most of the indicators used are still subjective and have not been fully compared with objective performance data such as cost efficiency, timeliness, or work quality deviation.

4. Conclusion

Based on the results of the Customer Satisfaction Index (CSI) calculation for five indicators with 26 variables, the level of project owner satisfaction with the performance of the supervisory consultant was found to be high. The highest CSI score was for the communication indicator at 86.64% (very satisfied), followed by the ability to guarantee and improve work quality (85.33%), the supervision indicator (83.90%), the quality of internal human resources (81.14%), and documents and administration (80.11%). These results indicate that, in general, supervisory consultants have performed their supervisory functions well, especially in terms of communication and coordination among project stakeholders.

Based on the results of the Importance Performance Analysis (IPA), six variables were found to be classified in Quadrant I (top priority) that need special attention for performance improvement. The six factors include aspects of reporting and evaluation of work progress that have not been consistent, the implementation of occupational safety and health management systems that are still limited in the field, the uneven ability of personnel to understand the latest construction regulations, the limitation of ongoing technical consultation services to all stakeholders, the low ability to provide recommendations for more efficient material or implementation method changes, and the suboptimal implementation of the latest technical regulations in project implementation. These findings confirm that administrative, technical, and communication factors play a major role in determining the level of project owner satisfaction with the performance of supervisory consultants, so that improvements in the quality of supervision need to focus on these areas to achieve a balance between regulatory compliance and the effectiveness of construction implementation in the field.

This study produced improvement strategies that can be implemented immediately, including establishing disciplined and timely reporting standards, increasing work safety awareness through occupational health and safety education and the use of field checklists, improving technical competence through regular training and access to the latest regulatory documents, developing a technology-based communication system for real-time online coordination, and adjusting the number and qualifications of supervisory personnel to match the complexity of the project. These strategies were validated by the

Commitment Making Officer (PPK) and deemed feasible for implementation in the context of local government projects.

This study found that although the overall satisfaction level was high, there was still a gap between the project owner's expectations and the actual performance of the supervisory consultant, especially in terms of reporting and the application of the latest technical regulations. This shows that the success of supervision is not only determined by technical capabilities, but also by the effectiveness of the administrative system, cross-functional communication, and adaptation to rapid regulatory changes.

This study has several limitations. First, the scope of the study only covers building projects in Tapin Regency, so the results cannot be generalized to other infrastructure projects or different regions. Second, the data collection method used a cross-sectional questionnaire based on respondent perceptions, so it does not reflect the dynamics of performance changes over time. Third, the analysis used is descriptive and does not explain the cause-and-effect relationship between variables, so further research using an inferential analysis approach such as Structural Equation Modeling (SEM) is recommended to test the influence between factors.

The findings of this study have significant practical and academic implications. For local governments, the results of this study can be used as a basis for formulating policies to improve project supervision quality through training, certification, and digitization of reporting. For supervision consultants, these results serve as a reference in setting performance improvement priorities to be more responsive to project owner needs. Meanwhile, for academics, this research enriches the empirical literature in the field of construction management, particularly regarding the relationship between supervision effectiveness, project owner satisfaction, and the success of construction implementation at the local level.

Author Contributions

Hafizah Aulia: Conceptualization, methodology design, data collection, data analysis, and drafting of the manuscript.

Irfan Prasetya: Validation, supervision, guidance on analytical techniques, and critical revision of the manuscript.

Retna Hapsari Kartadipura: Literature review, refinement of research instruments, interpretation of findings, and final manuscript editing.

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Conflicts of Interest

The authors declare no conflicts of interest related to this study.

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