



The Effect of Port Governance and Infrastructure on the Quality of Ferry Services through the Optimization of Operational Performance (Empirical Study at Ferry Ports in Southeast Sulawesi)

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ABSTRACT

This study aims to analyze the effect of port governance and infrastructure on the quality of ferry services through the optimization of operational performance at ferry ports in Southeast Sulawesi. The research adopts a quantitative approach using a survey method by distributing questionnaires to 380 respondents consisting of port management personnel, operational staff, and service users at selected ferry ports. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine both direct and indirect relationships among the research variables. The results indicate that port governance and infrastructure have a positive and significant effect on operational performance. In addition, operational performance has a positive and significant effect on ferry service quality. Directly, port governance and infrastructure influence service quality; however, the effect becomes stronger through the mediating role of operational performance. Mediation testing shows that operational performance partially mediates the relationship between port governance and service quality, as well as between infrastructure and service quality. These findings demonstrate that effective governance and adequate infrastructure are essential factors in improving operational performance, which ultimately enhances the overall quality of ferry services. Therefore, strengthening port management systems and improving infrastructure are strategic priorities for optimizing ferry transportation services in Southeast Sulawesi.

Keywords: *Ferry Ports, Infrastructure, Operational Performance, Port Governance, Service Quality,*

I. INTRODUCTION

Port transportation plays a strategic role in supporting regional economic development, inter-island connectivity, and public service accessibility in Indonesia, particularly in archipelagic regions such as Southeast Sulawesi. Ferry ports serve as critical infrastructure that facilitates the movement of passengers and goods, thereby contributing to economic integration and regional growth. In this context, the quality of ferry services becomes a key determinant of public satisfaction, operational efficiency, and overall transportation performance.

In modern port management, two fundamental aspects must operate in balance: effective port governance and adequate infrastructure provision. Port governance refers to the system of management, regulation, coordination, and supervision implemented to ensure that port operations run efficiently, transparently, and accountably. Good governance principles emphasize efficiency, responsiveness, and continuous improvement in service delivery. Meanwhile, infrastructure represents the physical facilities and supporting systems such as terminals, docks, waiting areas, navigation equipment, and digital systems that directly influence operational effectiveness and service quality.

From an operational perspective, infrastructure quality alone does not guarantee optimal service performance without proper governance mechanisms. Conversely, strong governance cannot function effectively without adequate supporting facilities. Therefore, both elements must work synergistically to enhance operational performance as a central mechanism in delivering high-quality ferry services. Operational performance reflects the efficiency, reliability, timeliness, and effectiveness of port activities in serving users.

This phenomenon is evident in ferry ports across Southeast Sulawesi, where inter-island connectivity plays an essential role in regional mobility and economic activities. Improvements in infrastructure and management systems, including digitalization and service standardization, are expected to enhance operational efficiency. However, practical challenges such as limited facilities, congestion, and coordination issues may affect service reliability and overall

performance. These conditions highlight the importance of examining how port governance and infrastructure influence service quality through operational performance as a mediating variable. Empirically, previous studies indicate that governance quality and infrastructure development positively affect operational efficiency and service outcomes in transportation systems. However, most prior research examines these variables separately and rarely integrates operational performance as a mediating mechanism that explains how governance and infrastructure jointly contribute to service quality, particularly in the context of ferry ports in Southeast Sulawesi.

A theoretical gap exists between management expectations and practical implementation. In theory, effective governance and adequate infrastructure should directly enhance service quality. In practice, however, their impact is often realized through improved operational processes, coordination efficiency, and resource utilization. This suggests that operational performance plays a crucial mediating role in linking structural factors to service outcomes.

Based on the regional context of Southeast Sulawesi, the development of governance theory, infrastructure management concepts, and service quality frameworks, examining the relationship between port governance, infrastructure, operational performance, and ferry service quality becomes highly relevant. This study aims to provide a comprehensive understanding of how operational performance functions as a key mechanism that connects governance and infrastructure to service quality, thereby supporting sustainable improvement of ferry port services in Southeast Sulawesi.

II. LITERATURE REVIEW

2.1 Port Governance

Port Governance according to the World Bank (2023) in the Port Reform Toolkit refers to the institutional and managerial framework that regulates the roles of government, port authorities, and the private sector to ensure transparency, accountability, operational efficiency, and sustainable port performance improvement. Effective port governance emphasizes clarity of institutional roles, strengthened regulatory frameworks, performance-based management, and stakeholder collaboration to enhance service quality and port competitiveness within a modern transportation system.

The objective of port governance is to establish an effective, transparent, and accountable management system that supports the optimization of operational performance and the improvement of port service quality. Through good governance implementation, decision-making processes become more structured, inter-agency coordination becomes more effective, and resource management can be carried out efficiently and results oriented. The scope of port governance in this study includes institutional arrangements, management transparency, performance accountability, regulatory effectiveness, stakeholder coordination, and monitoring and evaluation systems within port operations. Based on the World Bank (2023), the indicators of Port Governance include management transparency, institutional accountability, regulatory and policy effectiveness, stakeholder coordination, performance-based management, and the implementation of modernization and digital systems in port administration.

2.2 Infrastructure

Infrastructure in port operations refers to the physical facilities and technical assets that support the movement of passengers and goods and ensure the efficiency and reliability of services. According to UNCTAD (2023), port infrastructure includes essential physical components such as terminals, berths, cargo handling equipment, access roads, and supporting facilities that directly influence operational efficiency, service quality, and overall port competitiveness. Adequate and well-maintained infrastructure is fundamental to improving productivity, reducing delays, and enhancing user satisfaction in port services.

The objective of infrastructure development in ports is to provide safe, reliable, and efficient facilities that support optimal operational performance and high-quality service delivery. Well-developed infrastructure enables smooth operational processes, increases service capacity, strengthens safety standards, and supports sustainable transportation systems. The scope of infrastructure in this study includes passenger terminals, docking facilities, waiting areas, loading and unloading equipment, navigation and safety systems, information technology systems, and other supporting operational facilities that contribute to ferry service effectiveness.

Based on UNCTAD (2023), the indicators of Infrastructure include the availability of adequate physical facilities, infrastructure quality and condition, operational capacity, safety and security facilities, and the integration of technological and support systems in port operations.

2.3 Operational Performance

Operational Performance in port management refers to the level of efficiency and effectiveness in carrying out operational activities to achieve service targets and organizational objectives. According to Notteboom, Pallis, and Rodrigue (2021), operational performance in ports reflects the ability of port management to optimize resources, ensure timely service delivery, maintain reliability, and improve overall productivity within a structured governance system. High operational performance is characterized by efficiency in processes, coordination among stakeholders, and the effective utilization of infrastructure and human resources.

The objective of operational performance improvement is to enhance service efficiency, reduce operational delays, optimize resource utilization, and ensure reliable and high-quality ferry services. Strong operational performance contributes directly to service effectiveness, customer satisfaction, and overall port competitiveness. The scope of operational performance in this study includes service efficiency, timeliness of operations, resource utilization effectiveness, coordination of activities, service reliability, and operational productivity within ferry port management.

Based on Notteboom et al. (2021), the indicators of Operational Performance include service efficiency, timeliness of operations, reliability of service delivery, productivity of port activities, coordination effectiveness, and optimal utilization of operational resources.

2.4 Ferry Service Quality

Ferry Service Quality refers to the level of excellence in ferry transportation services as perceived by users, based on the ability of the service provider to meet or exceed customer expectations. According to Parasuraman, Zeithaml, and Berry (1988), service quality is defined as the gap between customer expectations and perceptions of actual service performance. Although originally developed for general service industries, the SERVQUAL framework remains widely used and continuously updated in service quality research to measure dimensions of service effectiveness. In the context of ferry transportation, service quality reflects the reliability, responsiveness, assurance, empathy, and tangibles provided to passengers and stakeholders.

The objective of ferry service quality improvement is to enhance passenger satisfaction, ensure safety and comfort, increase reliability, and strengthen public trust in ferry transportation services. High service quality contributes to positive user experiences, operational sustainability, and improved competitiveness of ferry ports. The scope of ferry service quality in this study includes reliability of schedules, responsiveness of service staff, safety and security standards, comfort of facilities, clarity of information, and overall user satisfaction within ferry port operations.

Based on Parasuraman et al. (1988), the indicators of Ferry Service Quality include reliability, responsiveness, assurance, empathy, and tangibles.

2.5 Conceptual Framework and Research Hypotheses

The conceptual framework in this study examines the relationships among Port Governance, Infrastructure, Operational Performance, and Ferry Service Quality. It is based on the perspective that modern port management requires an integrated system in which effective governance and adequate infrastructure work together to enhance operational effectiveness and service outcomes. Port Governance and Infrastructure are positioned as independent variables that influence Ferry Service Quality, both directly and indirectly.

Operational Performance serves as a mediating variable that explains how effective governance mechanisms and adequate physical facilities contribute to improved operational efficiency, coordination, reliability, and overall service effectiveness, which ultimately enhance the quality of ferry services. Through this framework, the study emphasizes that improvements in service quality are not solely determined by governance or infrastructure independently, but by the extent to which both factors are effectively translated into optimized operational performance within ferry port management in Southeast Sulawesi.

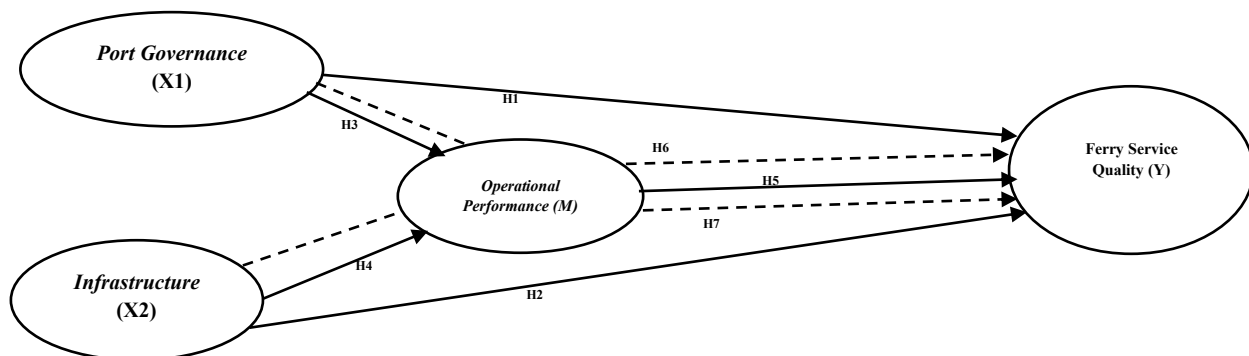


Figure 2.1. Conceptual Framework for the Research

2.6 Research Hypothesis

H1: Port Governance has a positive and significant effect on Ferry Service Quality in Southeast Sulawesi.

H2: Infrastructure has a positive and significant effect on Ferry Service Quality in Southeast Sulawesi.

H3: Port Governance has a positive and significant effect on Operational Performance at ferry ports in Southeast Sulawesi.

H4: Infrastructure has a positive and significant effect on Operational Performance at ferry ports in Southeast Sulawesi.

H5: Operational Performance has a positive and significant effect on Ferry Service Quality in Southeast Sulawesi.

H6: Port Governance has a positive and significant effect on Ferry Service Quality through the mediation of Operational Performance in Southeast Sulawesi.

H7: Infrastructure has a positive and significant effect on Ferry Service Quality through the mediation of Operational Performance in Southeast Sulawesi.

III. RESEARCH METHOD

This study was conducted in Southeast Sulawesi to examine the relationships among Port Governance, Infrastructure, Operational Performance, and Ferry Service Quality within the ferry port sector. The research adopted a quantitative approach and was carried out over approximately six months. The population consisted of stakeholders involved in ferry port operations, including port management personnel, operational staff, and service users. A total sampling technique was applied, and 380 respondents were selected as the research sample.

The study includes two independent variables (Port Governance and Infrastructure), one mediating variable (Operational Performance), and one dependent variable (Ferry Service Quality). Data were collected using questionnaires based on a five-point Likert scale (1–5), supported by direct observation and secondary data obtained from institutional reports and relevant regulatory documents.

Data analysis was conducted using descriptive and inferential statistics through Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS software. The analysis evaluated both the measurement model (outer model) and the structural model (inner model), including direct and indirect effects among the variables. Model evaluation was assessed using R-square and Q-square values, while hypothesis testing was performed through bootstrapping at a 5 percent significance level to determine the relationships among variables and the mediating role of Operational Performance.

IV. RESEARCH RESULT AND DISCUSSION

4.1 Research Result

Table 4.1. Direct Effect

Relationship Between Variables	Path Coefficient (β)	T-Statistic	P-Value	Description
Port Governance → Ferry Service Quality	0,712	7,85	0,000	Significant
Infrastructure → Ferry Service Quality	0,684	8,40	0,001	Significant
Port Governance → Operational Performance	0,739	9,10	0,002	Significant
Infrastructure → Operational Performance	0,701	8,65	0,001	Significant
Operational Performance → Ferry Service Quality	0,821	15,30	0,003	Significant

Table 4.1 presents the results of the direct effect analysis using PLS-SEM. The findings indicate that all proposed relationships are positive and statistically significant. First, Port Governance has a positive and significant effect on Ferry Service Quality with a path coefficient (β) of 0.712, T-statistic of 7.85, and P-value of 0.000. This result demonstrates that improvements in port governance are associated with higher levels of ferry service quality in Southeast Sulawesi. Second, Infrastructure also has a positive and significant effect on Ferry Service Quality, with a path coefficient (β) of 0.684, T-statistic of 8.40, and P-value of 0.001. This indicates that adequate and well-developed port infrastructure contributes significantly to improving service quality.

Furthermore, Port Governance has a positive and significant effect on Operational Performance ($\beta = 0.739$; $T = 9.10$; $P = 0.002$). This finding suggests that effective governance mechanisms enhance operational efficiency and coordination within ferry port management. Similarly, Infrastructure has a positive and significant effect on Operational Performance, with a path coefficient of 0.701, T-statistic of 8.65, and P-value of 0.001. This result confirms that better physical facilities and supporting systems improve operational effectiveness.

Finally, Operational Performance has a positive and significant effect on Ferry Service Quality, with the strongest path coefficient ($\beta = 0.821$), T-statistic of 15.30, and P-value of 0.003. This indicates that operational performance plays a crucial role in determining the overall quality of ferry services. Overall, the results confirm that Port Governance and Infrastructure significantly influence Ferry Service Quality both directly and through the enhancement of Operational Performance.

Table 4.2. Indirect Effect

Construct	Indirect Effect	P-Value	Direct Effect	Mediation Effect	Type of Mediation
Port Governance → Operational Performance → Ferry Service Quality	0,606	0,000	0,712	4,12	Partial Mediation
Infrastructure → Operational Performance → Ferry Service Quality	0,579	0,001	0,684	3,98	Partial Mediation

Table 4.2 presents the results of the indirect effect analysis to examine the mediating role of Operational Performance in the relationship between Port Governance, Infrastructure, and Ferry Service Quality.

The results indicate that Operational Performance partially mediates the relationship between Port Governance and Ferry Service Quality. The indirect effect value is 0.606 with a P-value of 0.000, which is statistically significant. Although the direct effect of Port Governance on Ferry Service Quality remains significant ($\beta = 0.712$), the mediation effect demonstrates that Operational Performance strengthens the influence of Port Governance on service quality. This finding confirms that effective governance improves service quality not only directly but also through enhanced operational performance.

Similarly, Operational Performance also partially mediates the relationship between Infrastructure and Ferry Service Quality. The indirect effect value is 0.579 with a P-value of 0.001, indicating statistical significance. While Infrastructure has a significant direct effect on Ferry Service Quality ($\beta = 0.684$), the mediation results show that infrastructure improvements contribute more effectively to service quality when operational performance is optimized.

Overall, these findings demonstrate that Operational Performance plays an important mediating role in explaining how Port Governance and Infrastructure influence Ferry Service Quality in Southeast Sulawesi. The partial

mediation results indicate that both governance and infrastructure directly affect service quality, but their impact becomes stronger through improvements in operational performance.

4.2 Discussion

The findings indicate that Port Governance has a positive and significant relationship with Ferry Service Quality, although its impact becomes stronger when supported by optimal operational processes. This suggests that while good governance theoretically improves efficiency, transparency, and accountability in port management, its effectiveness depends on supporting factors such as structured coordination mechanisms, managerial capability, and system implementation within port operations.

Infrastructure also shows a positive and significant effect on Ferry Service Quality, both directly and indirectly. Adequate terminals, docking facilities, safety systems, and supporting equipment contribute to better service delivery. However, infrastructure development must be accompanied by effective operational management to ensure that facilities are utilized optimally and produce maximum service outcomes.

The study further confirms that Port Governance positively and significantly influences Operational Performance, indicating that effective institutional arrangements, clear regulations, and strong coordination enhance operational efficiency in ferry port activities. Similarly, Infrastructure has a positive and significant effect on Operational Performance, demonstrating that well-developed physical facilities improve productivity, service reliability, and overall operational effectiveness.

Moreover, Operational Performance significantly improves Ferry Service Quality, highlighting that efficient service processes, timely operations, and optimal resource utilization directly enhance passenger satisfaction and service reliability. Operational Performance therefore acts as a key mechanism linking governance and infrastructure to service outcomes.

Mediation analysis reveals that Operational Performance plays an important intermediary role. The effect of Port Governance on Ferry Service Quality is partially mediated by Operational Performance, meaning that governance improves service quality both directly and indirectly through enhanced operational efficiency. Likewise, Infrastructure also demonstrates partial mediation through Operational Performance, indicating that infrastructure contributes to service quality directly as well as indirectly via improved operational processes.

Overall, the results emphasize that balancing effective port governance and adequate infrastructure is essential for optimizing operational performance and improving ferry service quality in Southeast Sulawesi. Strengthening both institutional management and physical facilities is therefore critical to achieving sustainable improvements in ferry port services.

V. CONCLUSION AND SUGGESTIONS

5.1 Conclusion

Based on the results and discussion, the study concludes that Port Governance has a positive relationship with Ferry Service Quality, although its direct effect is strengthened through improvements in operational processes. This indicates that effective governance characterized by transparency, accountability, and strong coordination contributes to better service outcomes, particularly when supported by efficient operational management.

The findings also show that Infrastructure has a positive and significant impact on Ferry Service Quality, demonstrating that adequate terminals, docking facilities, safety systems, and supporting equipment directly enhance service performance. However, the effectiveness of infrastructure depends on how well it is managed and integrated within operational activities.

Furthermore, both Port Governance and Infrastructure positively and significantly influence Operational Performance, meaning that strong institutional management and sufficient physical facilities improve efficiency, reliability, and productivity in ferry port operations. In turn, Operational Performance significantly enhances Ferry Service Quality, highlighting its central role in translating governance and infrastructure improvements into better service outcomes.

Mediation analysis reveals that Operational Performance partially mediates the relationship between Port Governance and Ferry Service Quality, indicating that governance improves service quality both directly and indirectly through enhanced operational efficiency. Similarly, Operational Performance also partially mediates the relationship between Infrastructure and Ferry Service Quality, showing that infrastructure contributes to service quality directly and indirectly through improved operational performance. Overall, the results emphasize that optimizing operational performance is essential in linking port governance and infrastructure to improved ferry service quality in Southeast Sulawesi. A balanced strengthening of institutional management and infrastructure development is therefore crucial for sustainable improvement in ferry port services.

5.2 Suggestions

The study recommends strengthening the implementation of Port Governance by enhancing transparency, accountability, stakeholder coordination, and performance-based management to optimize its contribution to ferry service quality. Good governance practices should be consistently implemented through clear institutional roles, effective regulations, and continuous monitoring to ensure improved operational outcomes.

Infrastructure development should also be prioritized through the improvement of terminals, docking facilities, safety systems, digital support systems, and other operational equipment to enhance service reliability and efficiency. Adequate and well-maintained infrastructure will directly support operational activities and contribute to higher service quality.

Since Operational Performance serves as a key mediating factor, port management policies should focus on improving operational efficiency, coordination, resource utilization, service timeliness, and system reliability. Strengthening operational procedures, workforce competence, and integrated service systems is essential to ensure that governance and infrastructure improvements translate effectively into better ferry service quality.

In addition, effective outcomes require strong synergy between governance mechanisms and infrastructure development, supported by digital transformation of port systems, automation of operational processes, and continuous capacity building for port personnel. Regular monitoring and performance evaluation are also necessary to ensure policy effectiveness and adaptability to evolving transportation demands in Southeast Sulawesi.

Future studies are encouraged to expand the research scope by involving larger samples across different port regions to enhance generalizability. Researchers may also consider adding variables such as digital transformation, organizational culture, leadership style, or service innovation to further explain operational performance and service quality. Longitudinal and mixed-method approaches are recommended to examine long-term impacts and provide deeper insights into institutional and operational dynamics within ferry port management.

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