Redesain Jaringan Tata Kelola Kebijakan Terintegrasi Dalam Collaborative Decision Making Guna Peningkatan Kualitas Layanan Penerbangan Dengan Pendekatan Soft Systems Methodology Based Multi
Method
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INTISARI

Harmonisasi *Air Traffic Flow Management* (ATFM) dan *Airport Collaborative Decision Making* (A-CDM) merupakan strategi fundamental dalam mewujudkan *Seamless Air Navigation Services* sebagaimana diarahkan ICAO melalui pengembangan sistem ATM yang terintegrasi, interoperabel, dan berkelanjutan. Indonesia telah mengadopsi berbagai kebijakan untuk mendukung implementasi ATFM dan A-CDM, namun pelaksanaannya masih bersifat parsial. Koordinasi antarpemangku kepentingan, sinkronisasi kebijakan, pengukuran kinerja, manajemen konflik operasional, serta tata kelola investasi infrastruktur belum berjalan optimal. Kondisi ini berdampak pada rendahnya efektivitas pengambilan keputusan kolaboratif dalam penyelenggaraan pelayanan navigasi penerbangan. Penelitian ini bertujuan mengembangkan Model *Integrated Policy Network* sebagai kerangka tata kelola kebijakan harmonisasi ATFM dan A-CDM di Indonesia. Penelitian menggunakan *Soft Systems Methodology* berbasis *Higher Order Thinking Skills* dengan pendekatan *theoretical research practice*. Analisis dilakukan melalui tahapan SSM yang meliputi identifikasi situasi masalah, penyusunan *Root Definition*, analisis CATWOE, pengembangan model konseptual, dan validasi melalui *Focus Group Discussion* bersama para pemangku kepentingan sektor penerbangan. Hasil penelitian menghasilkan empat komponen utama model harmonisasi. Pertama, pengembangan tata kelola kebijakan berbasis *Integrated Policy Network* yang memperkuat koordinasi antarlembaga melalui mekanisme *Collaborative Decision Making* dalam harmonisasi ruang udara sipil dan militer. Kedua, penyusunan *Key Performance Indicators* yang mencakup dimensi *Safety, Efficiency, Predictability, Capacity, Environment,* dan *Collaboration* yang diintegrasikan dengan mekanisme *Performance-Based Management* melalui sistem penghargaan dan tindakan perbaikan untuk mendorong peningkatan kinerja berkelanjutan. Ketiga, pengembangan kerangka Manajemen Konflik Operasional yang mendukung penyelesaian konflik secara kolaboratif, transparan, dan berbasis data. Keempat, pengembangan model Tata Kelola Investasi Infrastruktur dan Transformasi Digital yang mengintegrasikan perencanaan investasi, interoperabilitas sistem informasi, penguatan kapasitas organisasi, serta pemanfaatan teknologi digital dan *Machine Learning* sebagai *Decision Support System*. Penelitian ini membuktikan bahwa integrasi *Integrated Policy Network*, *Collaborative Decision Making*, *Performance-Based Management*, Manajemen Konflik Operasional, serta Tata Kelola Investasi Infrastruktur dan Transformasi Digital mampu membentuk model tata kelola yang adaptif, kolaboratif, dan berorientasi pada peningkatan kinerja. Model ini tidak hanya memperkuat harmonisasi implementasi ATFM dan A-CDM di Indonesia, tetapi juga memberikan kontribusi teoretis berupa pengembangan model tata kelola kebijakan berbasis jaringan yang mengintegrasikan pembelajaran organisasi, pengukuran kinerja, inovasi digital, dan pengambilan keputusan kolaboratif dalam mendukung sistem pelayanan navigasi penerbangan yang aman, efisien, prediktif, dan berkelanjutan.

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Kata kunci: Harmonisasi ATFM dan A-CDM, *Integrated Policy Network, Soft Systems Methodology, Higher Order Thinking Skills, Collaborative Decision Making, Key Performance Indicators, Performance-Based Management,* Manajemen Konflik Operasional, Transformasi Digital.

ABSTRACT

The harmonization of Air Traffic Flow Management (ATFM) *and Airport Collaborative Decision Making* (A-CDM) *constitutes a strategic approach to achieving Seamless Air Navigation Services* (ANS), *as mandated by the International Civil Aviation Organization* (ICAO) *through the development of an integrated, interoperable, and sustainable Air Traffic Management* (ATM) *system. Indonesia has formulated various policies and regulatory frameworks to support* ATFM *and* A-CDM *implementation, yet their execution remains fragmented across multiple stakeholders and operational domains. This fragmentation manifests in suboptimal stakeholder coordination, inadequate policy synchronization, ineffective performance measurement, unresolved operational conflicts, and insufficient infrastructure investment governance. These conditions collectively undermine the effectiveness of collaborative decision-making in air navigation service provision. This study aims to develop an Integrated Policy Network* (IPN) *Model as a comprehensive policy governance framework for* ATFM *and* A-CDM *harmonization in Indonesia. The research employs Soft Systems Methodology* (SSM) *enriched with Higher Order Thinking Skills* (HOTS) *and a theoretical research practice approach to address the complexity of multi-stakeholder policy coordination. The research process systematically follows the seven stages of* SSM, *encompassing problem situation identification, Root Definition formulation,* CATWOE *analysis, conceptual model development, comparison with real-world conditions, and model validation through Focus Group Discussions* (FGDs) *involving key aviation stakeholders including regulators, air navigation service providers, airport operators, airlines, and ground handling agents. The findings yield four interconnected components of the proposed governance model. First, an Integrated Policy Network-based governance framework strengthens inter-organizational coordination through Collaborative Decision Making* (CDM) *mechanisms, thereby enhancing the harmonization of civil and military airspace management. This framework establishes clear roles, responsibilities, and authority distribution among stakeholders while institutionalizing formal coordination forums and conflict resolution procedures. Second, a comprehensive Key Performance Indicators* (KPI) *framework encompasses the dimensions of Safety, Efficiency, Predictability, Capacity, Environment, and Collaboration. This* KPI *framework integrates with a*

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Performance-Based Management system that employs performance-based incentives for achieving targets and corrective actions for addressing deficiencies, thereby driving continuous organizational performance improvement. Third, the Operational Conflict Management Framework facilitates collaborative, transparent, and evidence-based resolution of operational conflicts among aviation stakeholders. This framework establishes structured mechanisms for identifying conflict sources, negotiating alternatives, and reaching consensus decisions while maintaining safety as the paramount consideration. Fourth, the Infrastructure Investment Governance and Digital Transformation Model integrates investment planning, information system interoperability, organizational capacity development, and the application of digital technologies and Machine Learning as a Decision Support System (DSS) *to improve operational prediction accuracy and decision-making quality. This study demonstrates that integrating the Integrated Policy Network, Collaborative Decision Making, Performance-Based Management, Operational Conflict Management, and Infrastructure Investment Governance and Digital Transformation produces an adaptive, collaborative, and performance-oriented governance model for air navigation services. The proposed model strengthens* ATFM *and* A-CDM *harmonization implementation in Indonesia while extending the theoretical discourse on network governance. The model's theoretical contribution lies in integrating organizational learning mechanisms, collaborative governance principles, performance management systems, digital innovation strategies, and data-driven decision-making processes within a unified policy framework. Furthermore, the model provides practical guidance for policymakers and aviation stakeholders to enhance the safety, efficiency, predictability, sustainability, and operational resilience of Indonesia's air navigation service system. This guidance directly supports* ICAO's *vision of a seamless and globally interoperable* ATM *environment while addressing Indonesia's specific operational challenges and institutional contexts.*

Keywords: Air Traffic Flow Management (ATFM) *and Airport Collaborative Decision Making* (A-CDM) *Harmonization, Integrated Policy Network, Soft Systems Methodology, Higher Order Thinking Skills, Collaborative Decision Making, Key Performance Indicators, Performance-Based Management, Operational Conflict Management, Digital Transformation.*