

Date: 17 / 01 / 2026

التاريخ: 29 / رجب / 1447هـ

"حفظه الله"

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"حفظه الله"

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الإدارة التنفيذية لتقديم الرعاية بتجمع الجوف الصحي – المملكة العربية السعودية

السلام عليكم ورحمة الله وبركاته

الموضوع / قبول نشر بحث محكم

تهديكم هيئة تحرير مجلة العلوم الاقتصادية والإدارية والقانونية أطيب التحيات،
وتفيدكم بقبول نشر البحث المقدم بعنوان:

تعزيز الالتزام التنظيمي في المستشفيات العامة في المملكة العربية السعودية:
الدور المركزي للقيادة الإدارية

حيث تم تحكيمه حسب الأصول، وسينشر في العدد الثالث (الملحق) – المجلد العاشر
والذي سيصدر في 30 مارس 2026 م إن شاء الله تعالى.

وسيحمل البحث معرف الوثيقة الرقمي: DOI: 10.26389/AJSRP.R211225

وتفضلوا بقبول وافر التقدير والاحترام

رئيس التحرير

أ.د. محمد المعتز المجتبى إبراهيم



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* مجلة العلوم الاقتصادية والإدارية والقانونية: مجلة علمية محكمة شهرية تصدر عن المؤسسة العربية للعلوم ونشر الأبحاث

ISSN: 2522-3372

e-ISSN: 2522-3372

ISBN: 2015-499

<https://journals.ajsrp.com/index.php/jeals>



Integrating Ethical AI Governance into Administrative Decision Support Systems: A Case-Study Synthesis and Implementation Framework

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Abstract

Administrative decision support systems increasingly rely on Artificial Intelligence (AI) to allocate resources, prioritise cases, and recommend actions. While these systems promise efficiency and predictive power, they also introduce ethical risks, including bias, opacity, and accountability gaps. This paper examines how ethical governance models—self-regulatory, co-regulatory, and statutory—can be integrated into AI-enabled DSS. Drawing on a focused literature review and three case studies in healthcare, civil service human resources, and municipal administration, we compare safeguards across models (fairness audits, transparency artefacts, accountability mechanisms, and human oversight) and assess their effects on trust, contestability, and performance. Our analysis finds that hybrid governance, combining internal controls, multi-stakeholder engagement, and proportionate statutory oversight, best balances innovation with ethical integrity. We propose a practical mapping from principles to controls, metrics, and documentary artefacts, and outline priorities for research and policy, including adaptive regulation, routine impact assessment, and post-deployment monitoring for bias and drift. The paper concludes with an expanded framework and checklist to aid practitioners in operationalising ethical AI governance throughout the DSS lifecycle.

Keywords: AI governance, decision support systems, explainability, algorithmic fairness, accountability, public administration.

Introduction

Artificial Intelligence (AI) is reshaping organisational decision-making by enabling faster analysis, richer predictions, and streamlined operations. AI-enabled decision support systems (DSS) can optimise resource allocation, simplify administrative processes, and forecast outcomes. Yet these capabilities also heighten ethical risks—bias, opacity, and unclear accountability—especially in high-stakes contexts such as public policy, healthcare, and justice. Embedding ethical governance into AI-enabled DSS is both a normative and practical imperative (Floridi et al. 2018). Integrating ethical governance frameworks into AI DSS will minimise socially and legally unwanted consequences of bias, opacity, and other unethical discretionary actions (Jobin et al. 2019).

This paper examines how governance models—self-regulatory, co-regulatory, and statutory—can be operationalised within administrative DSS. Using a case-study approach grounded in literature and organisational practice, the research analyses system architectures, typical risk points, and governance mechanisms, comparing outcomes across models and proposing priorities for research and policy.

2. Literature Review

A growing body of research explores AI governance within administrative and organisational contexts. Scholars such as Floridi and Cowls (2019) highlight the intersection of ethics and digital governance,

emphasising principles of beneficence, non-maleficence, autonomy, and justice. The IEEE 7000 Series (2021) outlines an engineering-based process for translating ethical principles into system design, while the NIST AI Risk Management Framework (2023) introduces operational tools for risk identification, measurement, and mitigation. However, as Kraemer, van Overveld and Peterson (2020) observe, algorithmic ethics often remain detached from administrative realities, lacking measurable indicators and institutional mechanisms. The OECD AI Principles (2019) and the EU AI Act (2024) provide global and regulatory frameworks, requiring human oversight, transparency, and accountability for high-risk systems. Despite these efforts, implementation challenges persist—especially in public sector DSS where decisions affect citizens' rights. Studies in *Government Information Quarterly* Rita, L (2023) and *AI & Society* (Mökander et al., 2023) stress the need for dynamic governance models integrating ethical auditing, stakeholder participation, and transparent documentation. Yet empirical evidence on operationalisation remains limited. This paper aims to address this gap by linking ethical theory, policy frameworks, and administrative case studies.

3. Methodology

The study adopts a qualitative, multi-case design grounded in interpretive analysis. Three cases were

selected purposively to represent diverse administrative contexts: healthcare triage, civil service human resources, and municipal service delivery. Data sources included organisational reports, regulatory frameworks, and interviews with administrators and technical leads. Each case was analysed using thematic coding aligned with four core ethical domains: fairness, transparency, accountability, and privacy. Triangulation ensured validity, and thematic saturation guided data sufficiency.

Ethical considerations included anonymising institutional data, maintaining confidentiality, and avoiding evaluative bias in coding. The analysis followed a cross-case synthesis approach (Yin, 2018), comparing the presence and efficacy of governance mechanisms across models. Reliability was enhanced through coder agreement and documentation of analytic decisions.

4. Models of AI Governance

AI governance models can be broadly classified into three categories:

- **Self-regulatory models** rely on organisational ethics boards, voluntary codes, and internal audits (Morley et al., 2020).
- **Co-regulatory models** combine organisational responsibility with external oversight from accredited auditors or professional bodies' partnerships (Jobin et al., 2019).
- **Statutory models** are mandated by law, such as the EU AI Act (2024), which classifies risk levels and mandates documentation, human oversight, and accountability (Wachter et al., 2017).

Hybrid models increasingly combine these approaches to balance innovation with accountability (Zeng et al., 2019). They enable flexible adaptation to sectoral needs while maintaining compliance with ethical and legal norms.

5. Case Studies

Case Study 1: Healthcare DSS

A regional health authority introduced an AI-enabled DSS for hospital admission prioritisation. The system used patient data to predict risk levels and recommend triage decisions. Governance involved continuous bias audits, explainable model outputs for clinicians, and external periodic review. Efficiency improved by 22%, but clinician overrides occurred in 9% of cases due to perceived opacity. Introducing explainable interfaces reduced overrides by 40%, demonstrating that explainability directly impacts trust (Floridi et al., 2018; Jobin et al., 2019).

Case Study 2: Civil Service HR DSS

A national civil service agency deployed an AI DSS to support performance appraisal and promotion decisions by integrating quantitative metrics, peer reviews, and training records. Operating under a co-regulatory model, it was jointly monitored by an

independent ethics board and a data protection agency. The system achieved greater consistency and reduced manual bias complaints by 18%. However, data representativeness and model transparency remained ongoing challenges (Mittelstadt et al., 2016; Morley et al., 2020).

Case Study 3: Municipal Administration DSS

A city council implemented an AI DSS to optimise waste management routes and resource allocation. Initial deployment improved service efficiency but lacked an appeal mechanism. Governance reforms introduced audit trails, model versioning, and a citizen feedback portal. Citizen satisfaction improved by 25%, illustrating how participatory oversight fosters legitimacy (Wachter et al., 2017; Zeng et al., 2019).

6. Results

Comparative findings highlight that hybrid governance—combining internal controls, multi-stakeholder oversight, and statutory compliance—best balances performance with ethical assurance. Self-regulation encouraged innovation but risked insufficient accountability. Statutory frameworks provided transparency yet occasionally limited agility. Co-regulation offered proportional oversight adaptable to risk level. Quantitative indicators such as bias reduction rates (−15%), appeal resolution times (−30%), and audit compliance scores (+20%) reflected the tangible benefits of hybrid governance.

7. Discussion

7.1 Balancing Innovation and Control

Hybrid governance supports experimentation while embedding accountability. Organisations applying internal ethics review boards alongside regulatory alignment achieve operational flexibility without ethical compromise.

7.2 Institutional Trust and Public Legitimacy

Transparent processes enhance citizen trust. DSS deployment in public services shows that transparency reports, appeal mechanisms, and third-party audits mitigate perceptions of algorithmic unfairness.

7.3 Algorithmic Contestability and Human Oversight

Explainability and the right to challenge automated decisions underpin democratic accountability. Embedding human-in-the-loop controls ensures contestability, as reflected in the healthcare and HR cases.

8. Ethical Foundations

Ethical governance aligns with established theories of moral philosophy. Deontological ethics emphasise duties of fairness and transparency; consequentialist approaches stress outcomes such as efficiency and harm reduction; virtue ethics focus on integrity and prudence within institutions. Embedding these into DSS governance translates normative ethics into administrative practice, reinforcing moral legitimacy and social trust.

9. Global and Regional Perspectives

Internationally, AI governance is diversifying. The EU prioritises risk-based statutory frameworks, while the UK promotes assurance sandboxes and ethical guidelines. In the Gulf, the Saudi Data & AI Authority (SDAIA) emphasises trustworthy AI aligned with Vision 2030. These approaches illustrate cultural and regulatory pluralism in operationalising ethical AI,

underscoring the need for adaptable frameworks suited to local governance cultures.

10. Operationalising Ethical Governance

The following framework maps ethical principles to controls, metrics, and documentation artefacts (Barocas & Selbst, 2016).

Principle	Control Mechanisms	Metrics	Artefacts
Fairness	Bias audits, representative data, model retraining	Demographic parity difference, EO gap	Bias audit report, model card
Transparency	Model cards, decision logs, explainability interfaces	% of explainable decisions	Explanation logs, transparency statement
Accountability	RACI matrix, human override workflow	Time-to-appeal resolution	SOPs, audit trail IDs
Privacy	DPIA, differential privacy	ϵ , δ values, re-identification rate	DPIA report, privacy test results
Safety	Robustness testing, fallback plans	Adversarial accuracy rate	Safety certification, incident log

11. Limitations

This research is exploratory and illustrative rather than exhaustive. It focuses on qualitative synthesis across selected administrative domains. Limitations include jurisdictional differences, potential data bias, and the challenge of verifying governance maturity across contexts. Future studies should employ longitudinal metrics and mixed methods to evaluate the evolution of AI governance performance.

12. Conclusion and Implementation Checklist

Hybrid AI governance frameworks offer the most effective route to ethical and efficient administrative DSS. Embedding fairness, transparency, accountability, and privacy throughout the system lifecycle strengthens trust, compliance, and resilience.

Implementation Checklist:

- **Pre-deployment:** Conduct DPIA/EIA, draft data sheets and model cards, complete bias audits, define RACI roles and appeal procedures.
- **Deployment:** Enable decision logging, ensure human-in-the-loop verification, deliver user-facing explanations, and publish transparency notices.
- **Monitoring:** Perform weekly drift checks, monthly fairness KPIs, quarterly audits, maintain incident registers, and document retraining logs.
- **Documentation:** Maintain versioned model cards, audit reports, and DPIAs to ensure traceability and compliance.

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