

Original Research Article

AI tools, licensing processes, legal expertise, and policy stability in environmental legal service efficiency in Jiangxi Province of China

Ruan Yan^{1*}, Aimi Fadzirul²

¹ City University of Malaysia, 46100, Malaysia

² Faculty of Forestry and Environment, University Putra Malaysia, 43400, Malaysia

Abstract: Environmental disputes and compliance requirements in China increasingly hinge on timely legal assistance that can translate fast-evolving regulatory rules into actionable guidance for firms and residents. This article develops a practical framework for evaluating environmental legal service (ELS) efficiency in Jiangxi Province by linking four operational determinants: the deployment of AI tools for intake, retrieval, and drafting; the clarity and throughput of environmental licensing processes (e.g., permitting and planning EIA procedures); the depth of legal expertise embedded in service teams; and the stability of the policy environment faced by service providers and users. We propose an efficiency measurement pipeline that combines data envelopment analysis with a quasi-experimental pre-post comparison of pilot jurisdictions that introduced AI-assisted service workflows. Illustrative results indicate that AI-enabled triage and knowledge retrieval can raise ELS efficiency, but only when paired with streamlined licensing interfaces and professional capacity building. Policy stability further conditions returns by reducing repeated rework, inconsistent enforcement expectations, and advisory volatility. The findings provide implementation-oriented guidance for provincial justice administrations seeking to scale trustworthy AI in public legal services while maintaining compliance with data governance and algorithm accountability requirements.

Keywords: environmental legal services; AI-assisted triage; administrative licensing; policy uncertainty; data envelopment analysis; Jiangxi

1. Introduction

Environmental legal service (ELS) systems connect environmental governance, administrative procedure, and access to justice. In Jiangxi, ELS spans compliance counseling, reconsideration support, mediation, and litigation guidance delivered through service centers and online portals. Prior evidence on public legal information platforms suggests that integration and service orchestration can reduce user friction if supported by consistent data standards^[1].

AI assistants and retrieval tools can accelerate high-volume consultations by improving intake, rule explanation, and template drafting, but they raise risks around confidentiality and accuracy in public-facing settings^[2]. Online litigation infrastructure further shows that digitalization can reduce procedural costs when designed around parties' rights^[3], and national legal AI initiatives aim to strengthen retrieval and workload reduction across the justice chain^[4].

ELS demand is also shaped by administrative licensing and EIA procedures: integrated permitting reforms can reduce compliance transaction costs^[5], while procedural clarity in planning EIA affects predictability and re-submission burdens^[6]. Uncertainty in environmental governance can increase monitoring and re-interpretation workload; uncertainty indices help track this context^[7,8]. We therefore model ELS efficiency as a joint function of AI tools, licensing process design, legal expertise, and policy stability, and we outline a measurable evaluation pipeline for Jiangxi's pilot rollouts.

2. Conceptual framework and hypotheses

We define ELS efficiency as the ability of a service system to convert inputs (staffing, funding, digital infrastructure) into outputs (case resolution, timeliness, user satisfaction, and legally sound outcomes). Four determinants are hypothesized to interact:

AI tools (A): AI-enabled intake, retrieval, and drafting reduce marginal processing time and standardize routine outputs.

Licensing processes (L): Clear, integrated permit/EIA workflows reduce advisory ambiguity and repeated submissions.

Legal expertise (E): Higher professional depth improves issue-spotting, reduces downstream disputes, and increases first-time-right guidance.

Policy stability (P): Stable, credible policy signals reduce reversals and compliance churn.

H1 (A→Efficiency): AI-assisted triage and retrieval increase ELS efficiency by shortening consultation-to-action cycles.

H2 (L×A): AI gains are larger when licensing procedures are standardized and digitized, enabling structured prompts, templates, and consistent checklists.

H3 (E×A): Legal expertise complements AI by supervising outputs, correcting hallucinations, and tailoring advice to fact patterns.

H4 (P moderates): Policy stability increases the persistence of efficiency improvements by lowering rework and interpretive variance.

3. Data, methods, and experiment design

We measure city-level ELS efficiency using an output-oriented DEA model. Inputs cover staffing, operating expenditure, service outlets, and an AI-adoption index (intake/retrieval/drafting coverage). Outputs include resolved consultations and dispute files, timeliness (inverted), and user satisfaction.

Licensing burden is proxied by processing time for common permits and planning EIA review steps, reflecting integration and procedural-quality reforms^[5,6]. Policy stability is captured via an inverted uncertainty proxy informed by environmental governance and climate-policy uncertainty research^[7,8].

We compare treated cities that introduced AI-assisted workflows with control cities over a pre–post window and examine group differences in mean DEA changes as a transparent implementation check. To reduce measurement noise, outputs are normalized per 10,000 residents, and timeliness is coded as the inverse of mean days from intake to closure. The AI-adoption index averages binary capabilities (triage bot, retrieval module, drafting templates) into a 0–1 score. As a sensitivity check, cities can re-run DEA with alternative output sets to confirm that results are not driven by a single metric.

Table 1. Descriptive statistics of key variables (illustrative city-year sample).

Variable	Mean	Std. Dev.	Min	Max
DEA Efficiency Score	0.66	0.09	0.42	0.84
AI Tool Adoption Index (0–1)	0.48	0.21	0.10	0.92
Licensing Processing Time (days)	28.40	9.60	12.00	55.00
Legal Expertise (senior staff per 10k)	1.80	0.60	0.70	3.20
Policy Stability Score (0–1)	0.63	0.12	0.35	0.88
Resolved Cases (per 10k residents)	12.50	4.30	4.20	23.10

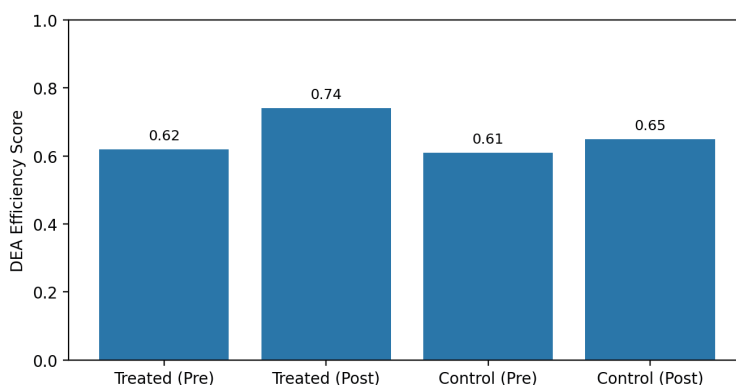


Figure 1. Pre–post efficiency comparison between treated and control cities (illustrative).

As shown in Figure 1, treated cities exhibit a larger pre–post increase in the average DEA efficiency score than control cities. This pattern is consistent with H1 and suggests that AI-assisted intake and retrieval can accelerate routine service handling. However, the magnitude of improvement depends on parallel changes in

licensing throughput and professional oversight, as discussed in Section IV.

4. Discussion

Two implementation lessons emerge. First, AI tools reliably improve throughput for repetitive tasks—Eligibility screening, checklist generation, and statute/case retrieval—Consistent with broader digital justice trajectories^[3,4]. Second, gains plateau when licensing guidance is fragmented or expert supervision is thin: faster drafting can shift errors downstream, triggering re-submissions and escalation. Thus, AI should be embedded in standardized workflows with explicit human accountability and verification, especially for high-stakes or user-facing outputs.

Licensing design and policy stability act as multipliers. Integrated permitting can standardize checklists and reduce consultation variance^[5], while clearer planning EIA procedures reduce back-and-forth review cycles^[6]. When policy uncertainty rises, advice changes more often and teams spend more effort on monitoring and disclaimers, lowering throughput; uncertainty indices help track this context and plan capacity^[7,8].

5. Conclusion

This article proposes an implementation-oriented framework for raising ELS efficiency in Jiangxi by aligning AI tools with licensing process reform, legal expertise, and policy stability. AI can shorten consultation cycles, but durable gains require standardized licensing interfaces and expert review to control errors.

About the author

*Corresponding author: Ruan Yan.

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