

Government Subsidy Effectiveness in Platform-Based Construction Waste Transaction Governance: An ISM-Based Mechanism Model



Y. Yang*, J.L. Hao*, J.F. Yuan**, B.W. Xu*

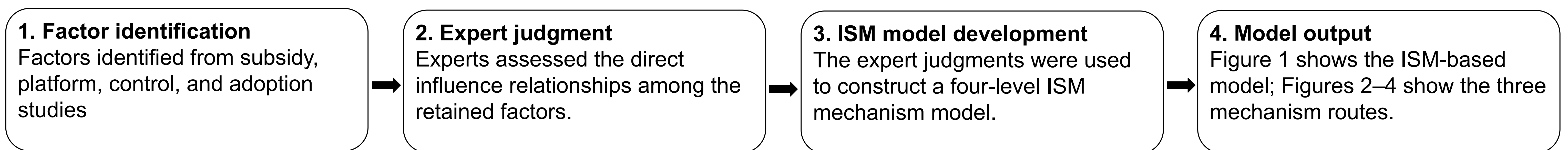
* Department of Civil Engineering, Xi'an Jiaotong-Liverpool University, Suzhou, Jiangsu, 215123, China
(E-mail: Yi.Yang2203@student.xjtlu.edu.cn)

** Department of Civil Engineering, Southeast University, Nanjing, Jiangsu, 211189, China

Introduction

Construction and demolition waste (CDW) remains a major challenge for urban sustainability. Although subsidy policies are widely used to support recycling, their effects are not stable across places and projects. Illegal disposal and the limited use of recycled materials in engineering practice remain persistent problems. Existing studies discuss subsidy design, governance, platform support, supervision, and market adoption as separate issues. What remains unclear is how these factors work together in a platform-based subsidy setting. This study develops an Interpretive Structural Modeling (ISM)-based mechanism model to examine how government subsidies affect platform-based construction waste transaction governance.

Model Development



Results & Discussion

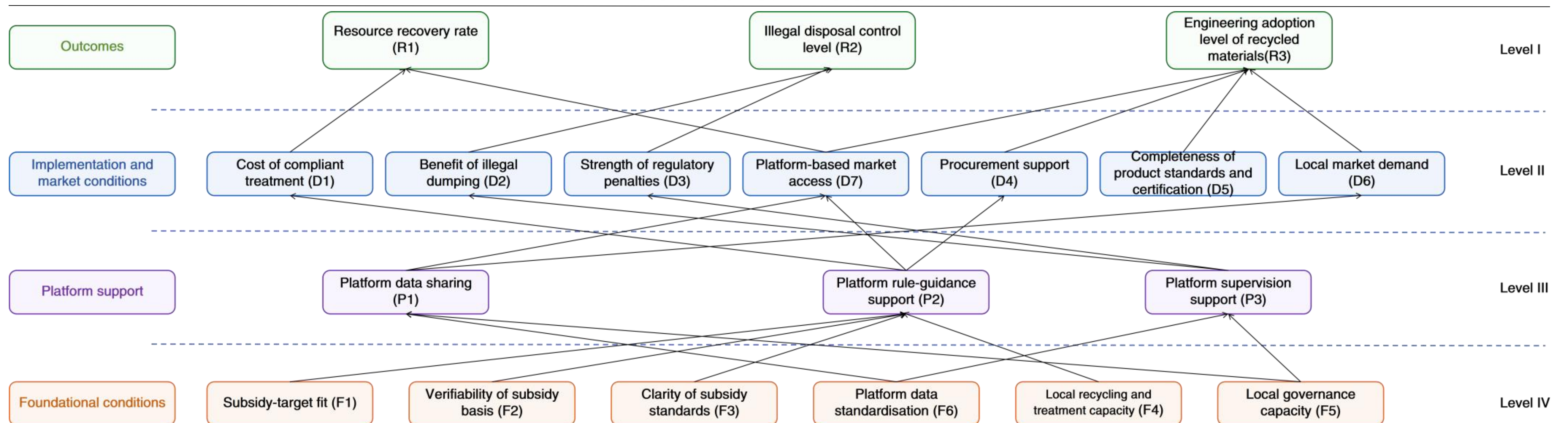
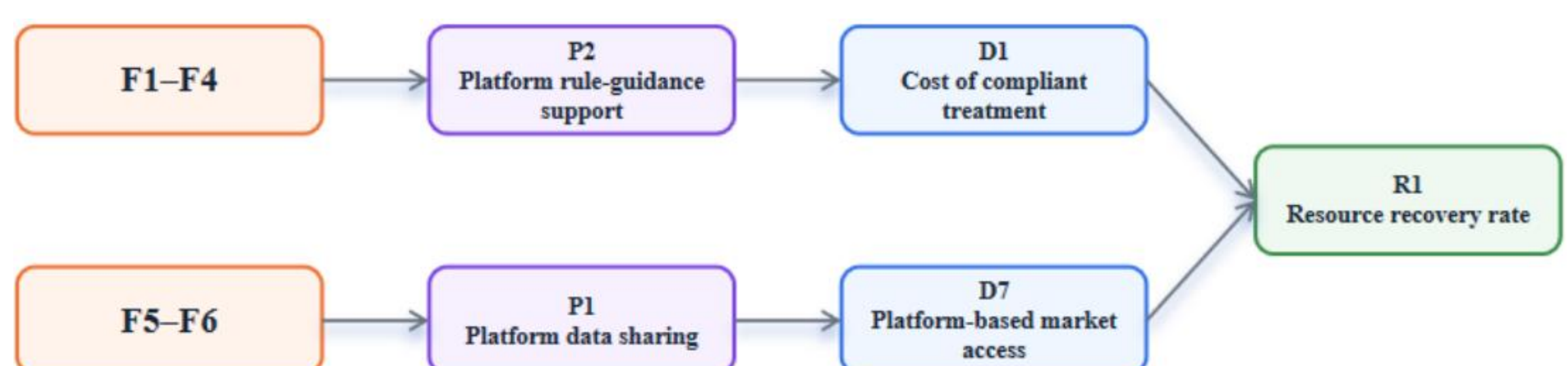


Figure 1. ISM-based mechanism model of government subsidies in platform-based construction waste transaction governance

Note: F=foundational conditions; P=platform support; D=implementation and market conditions; R=outcomes.

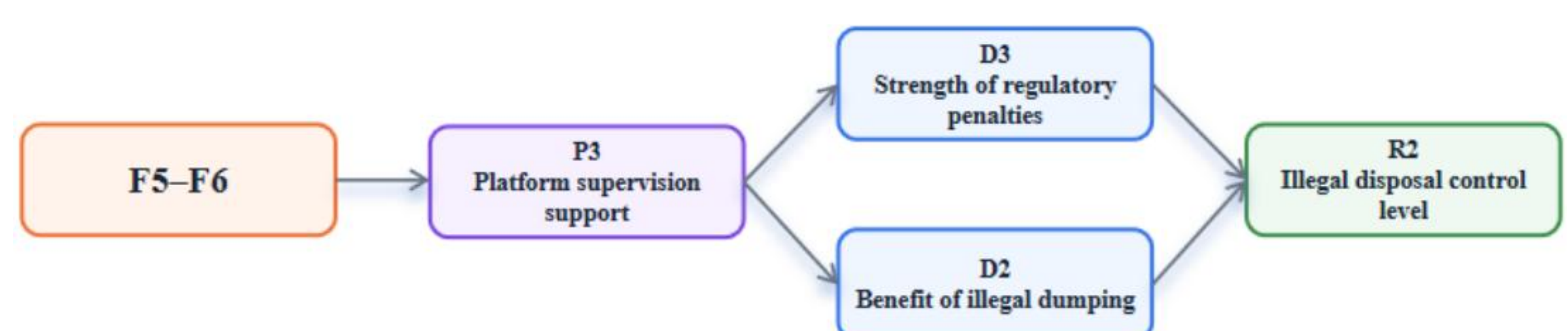
Figure 1 presents the ISM-based mechanism model developed from expert judgments. The model arranges the retained factors into four levels: foundational conditions, platform support, implementation and market conditions, and outcome dimensions. It shows how subsidy effects work through platform support and implementation conditions before reaching recovery, control, and adoption outcomes.

Figures 2–4 show three mechanism routes extracted from the ISM-based model: recovery, control, and adoption. F1–F4 and F5–F6 refer to grouped foundational conditions.



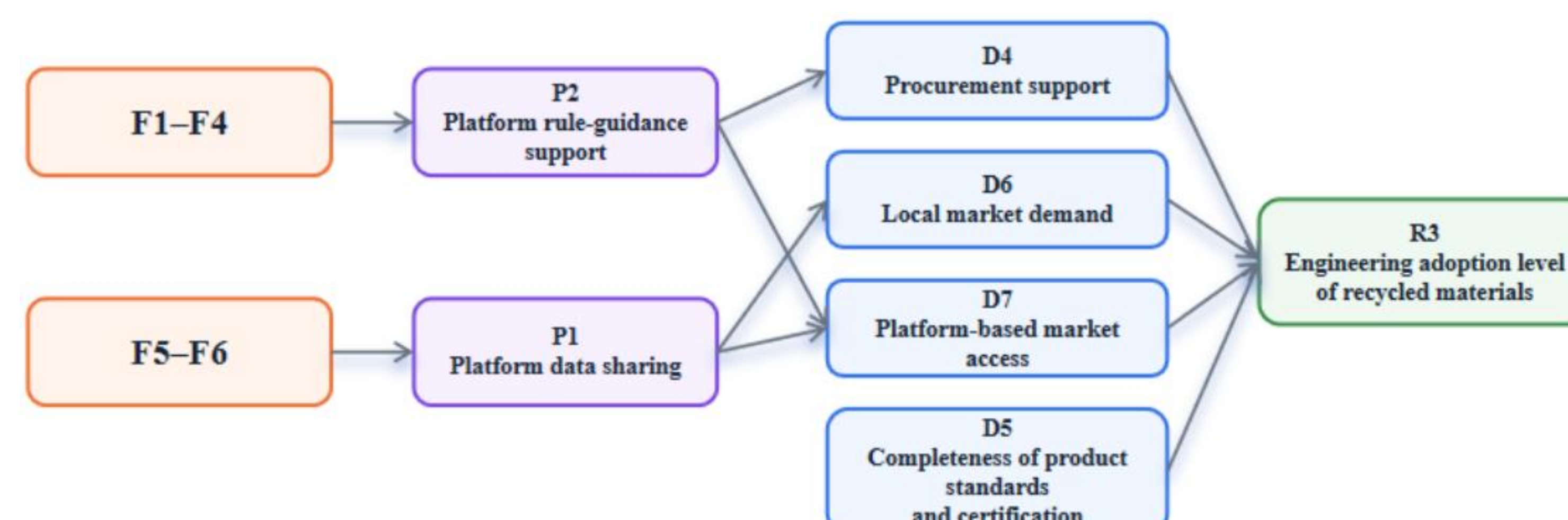
- Recovery performance depends on the cost of compliant treatment and platform-based market access.
- Platform rule-guidance reduces treatment barriers.
- Platform data sharing improves market connection.

Figure 2. Recovery mechanism route



- Illegal disposal control depends on the balance between regulatory pressure and illegal dumping benefits.
- Platform supervision supports stronger regulatory penalties.
- Control improves when the practical advantage of illegal dumping is reduced.

Figure 3. Control mechanism route



- Recycled-material adoption depends on procurement support, local market demand, market access, and product standards.
- Platform functions connect subsidy support with market demand, access, and quality assurance.
- Adoption improves when recycled materials gain both institutional support and practical acceptance.

Figure 4. Adoption mechanism route

Conclusions

This study presents an ISM-based mechanism model for evaluating government subsidy effectiveness in platform-based construction waste transaction governance. The model shows that subsidy effects work through four levels: foundational conditions, platform support, implementation and market conditions, and final outcomes. The three routes explain how subsidies affect resource recovery, illegal disposal control, and engineering adoption of recycled materials.