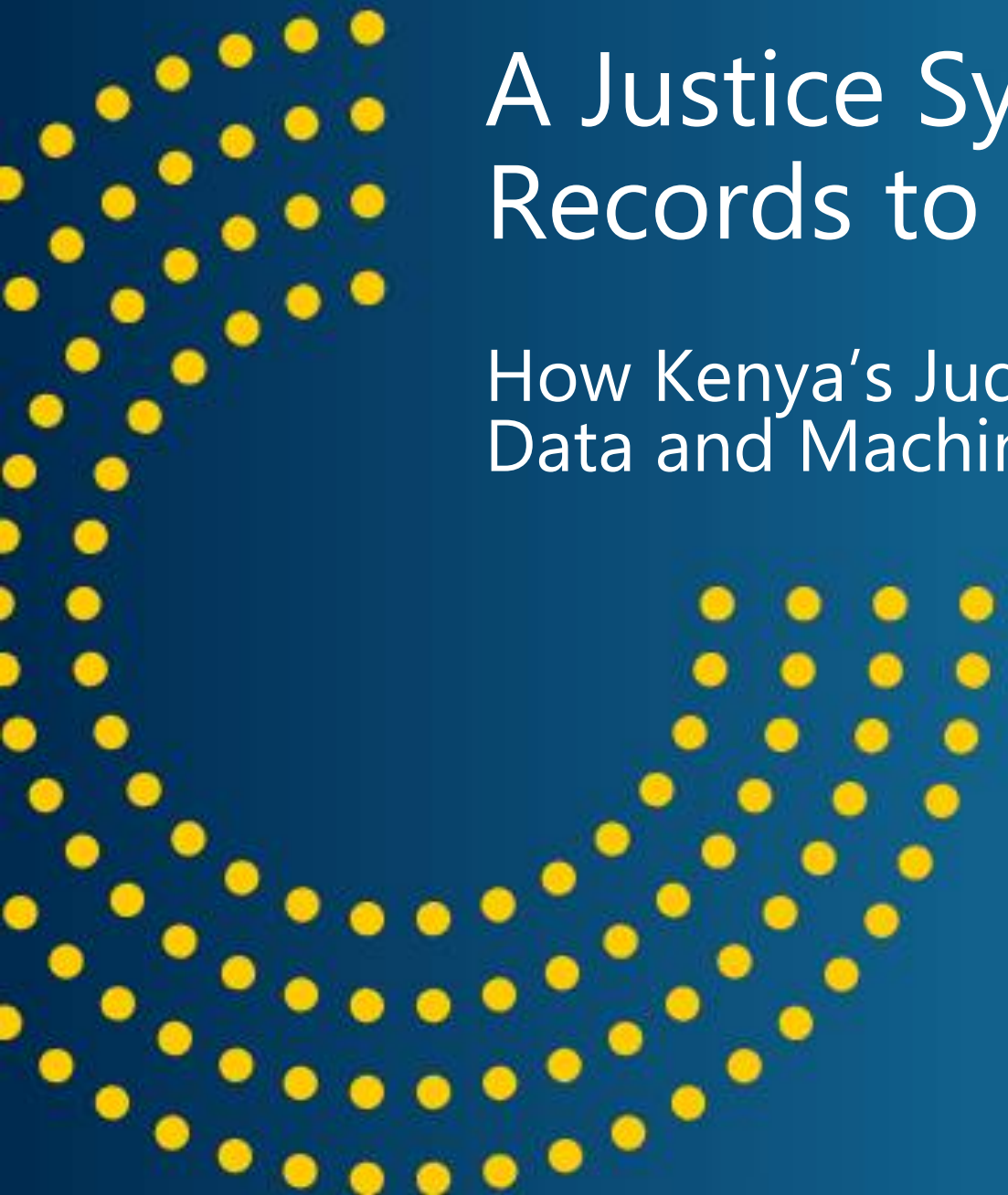
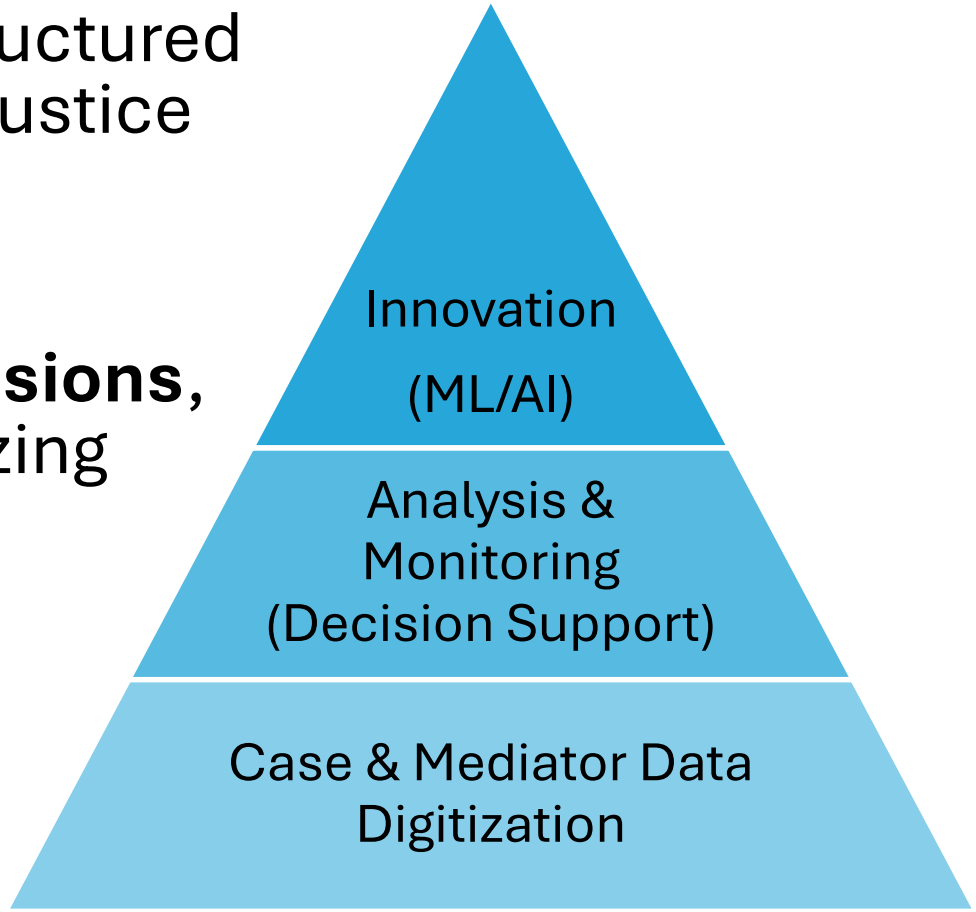
A Justice System's Leap from Records to Results

How Kenya's Judiciary is Reimagining Mediation with Data and Machine Learning



From Digitization to Data-Driven Service Delivery

- **Digitization is just the beginning** — structured systems lay the foundation for smarter justice delivery
- **Better use of data enables better decisions**, from monitoring performance to optimizing outcomes
- **Embedded experimentation helps systems learn**, adapt, and continuously improve over time



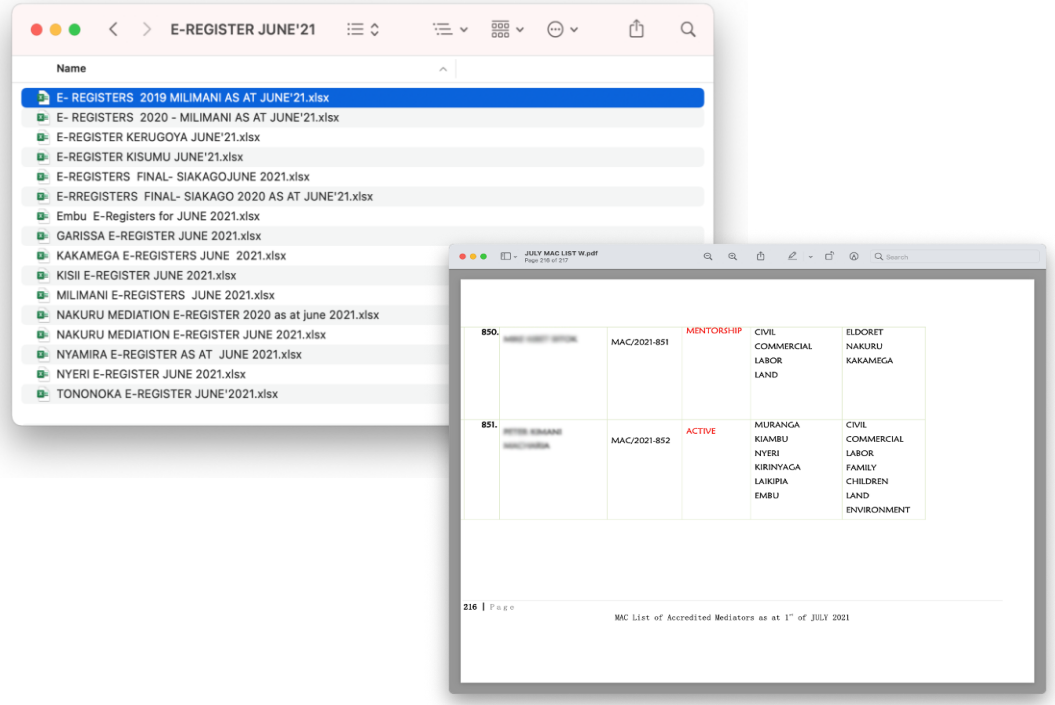
Before:
Fragmented Record Keeping & Tedious Reporting

Kenya's Court Annexed Mediation (CAM) program began in 2016, supported by World Bank's Judicial Performance Improvement Project (JPIP).

In 2020, the Judiciary and DIME (World Bank) launched a collaboration to measure and improve mediation outcomes.

At the outset:

- Fragmented records across paper files and Excel sheets
- Monitoring required manual consolidation — slow, labor-intensive, and error-prone
- Lack of real-time insights and incomplete data hindered diagnosis of case delays



Arbiter: The Mediation Case Management System

A centralized platform for mediator and case data management, featuring role-based access, real-time analytics, decision support, and reporting tools.

Immediate operational benefits:

- Real-time, high-quality administrative data: quality issues reduced from 73% to 2% of cases between 2021 and 2022.
- Delays from referral to mediator assignment and from case conclusion to mediator payment shrunk by ~60%

The platform uncovered valuable diagnostics insights, which are directly addressed within the system

Issues in case assignments to mediators:

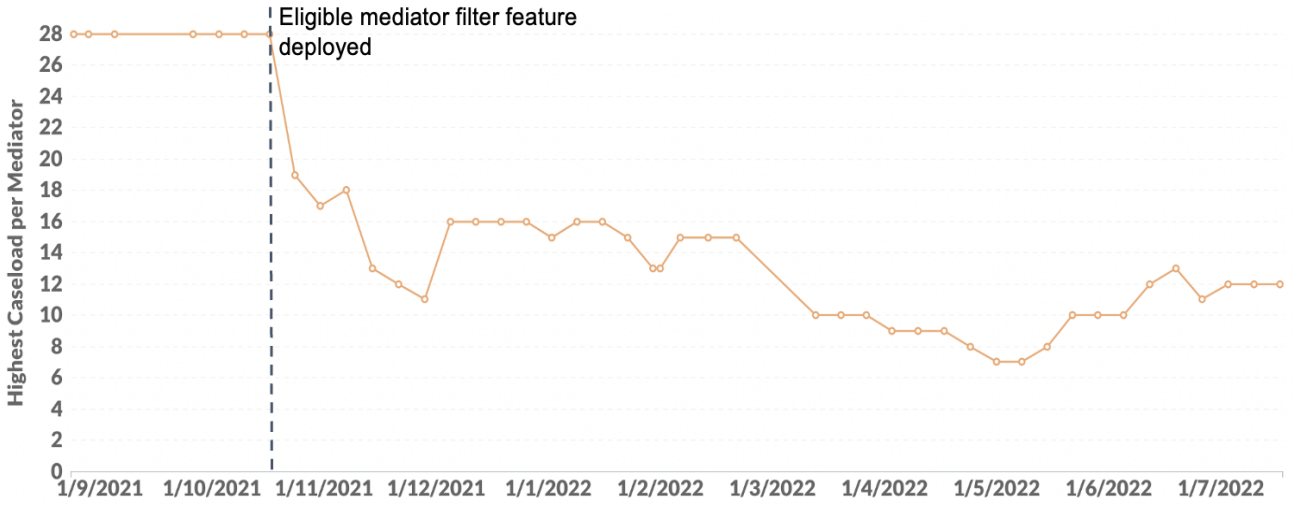
- Among qualifying mediators, some handled many cases while others received none.
- Cases assigned to ineligible mediators

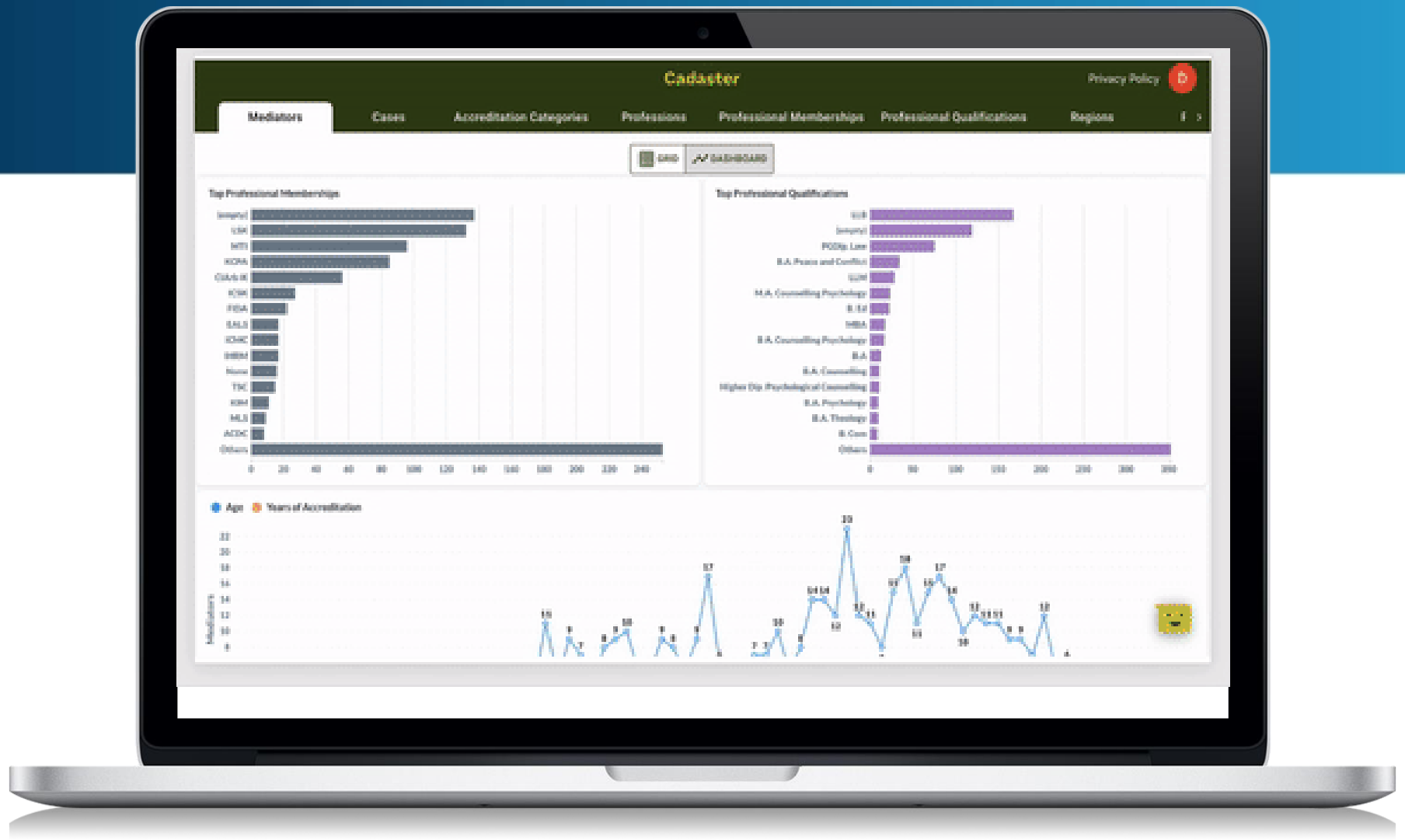
Solution: pre-selection of eligible mediators for assignment.

Improved case allocation fairness among active mediators

Mediator docket was 28 cases for the busiest mediator before appointment constraint feature. It reduced to 16 cases two months after the feature introduction, and remained 16 and under.

Share of unassigned active mediators reduced from 2% to 0.5%.





DIGITIZE | MANAGE | TRACK | OPTIMIZE

Can Data-driven, Adaptive Matching Lift Efficiency, Fairness, and Outcomes?

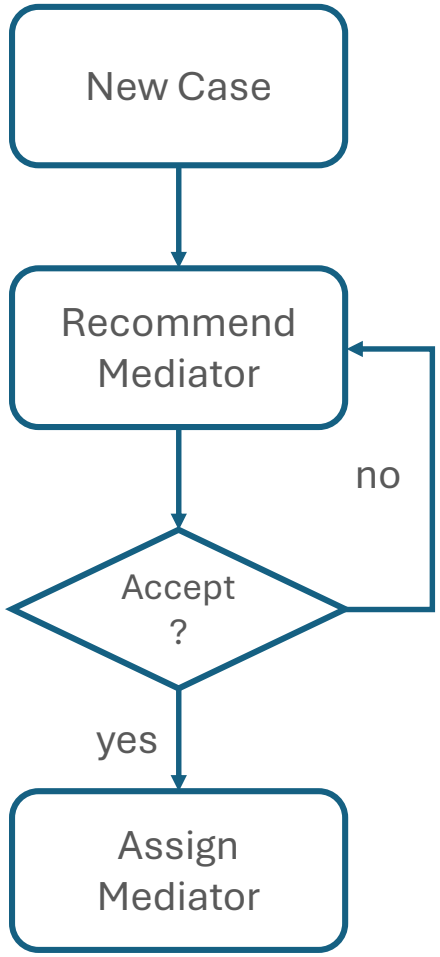
- Public services must **match cases to frontline staff or individuals** with varied capacity and skills.
- In Kenya mediation, **58 % of disputes still return to court**.
- Manual assignments **underutilize resources** and yield **uneven results**.
- **Scaling** nationwide makes hand matching infeasible, causing overload and inequity.

Smart Mediator Assignment: Multiple Objectives, One Solution

- For each new case, the platform suggests a mediator
- The judicial officer may accept or reject the suggested assignment
- Backend: a real-time algorithm that powers the recommendation engine

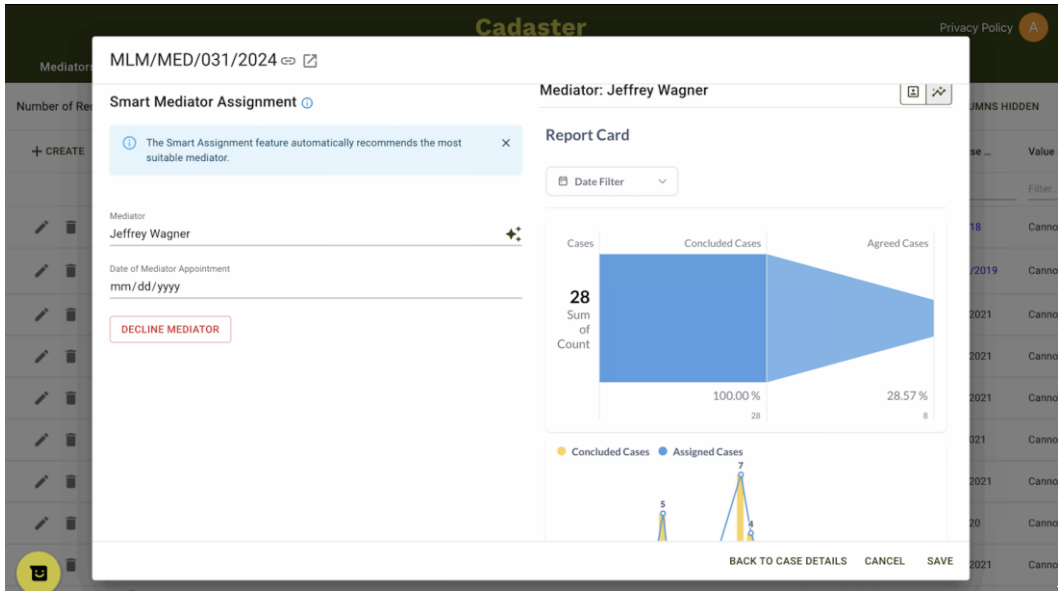
Algorithm objectives:

1. Manage mediation capacity
   - Respect caseload cap for each mediator
   - Each mediator may work multiple courts and case types
2. Increase performance: case agreements & duration
   - Estimate: up to 10-20% higher case agreement rates possible
3. Learn mediator's performance over time
   - Test new mediators with unknown agreement rate



Study 1:
Can Past Performance Predict Future Success?

- Estimated each mediator's "**value added**" using historical case data (≥4 cases).
- Introduced a **simplified smart assignment feature** that recommends mediators
  - based on past performance, while
  - respecting caseload cap & constraints
- **Randomized case assignment**:
  Compared outcomes of cases assigned to above-median vs. below-median value-added mediators



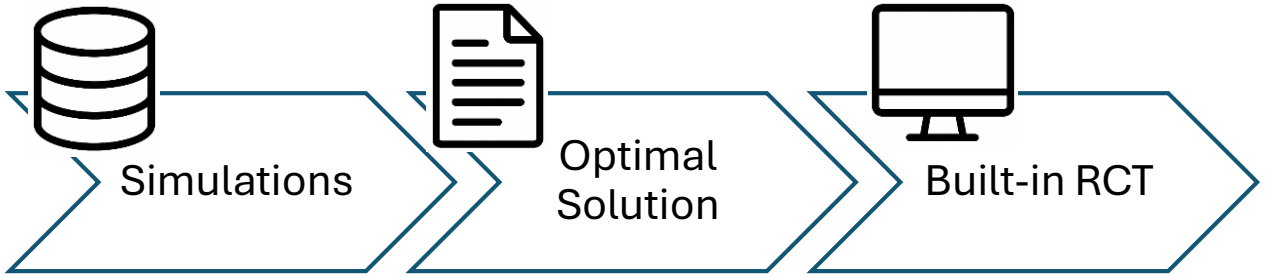
Result:

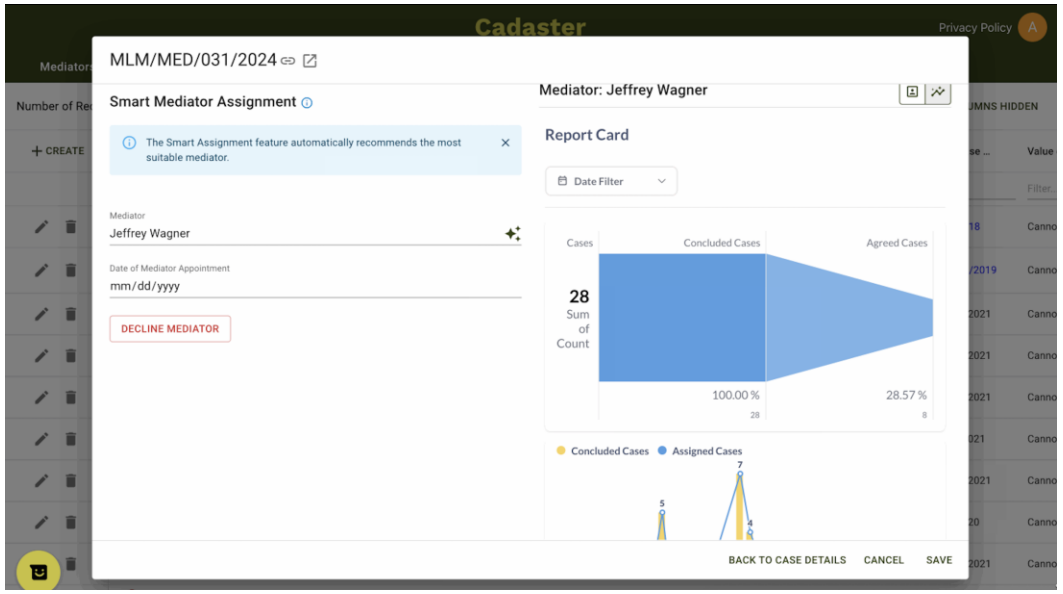
- Agreement rates were similar across groups
- Above-median mediators closed cases 15% faster

Study 2 (Ongoing): Designing & Testing Smart Assignment

Goal: A self-learning model that

- maximizes the **overall long-term rate of case resolution**, while
- maintaining **equity** in mediator caseloads





Challenge 1: Mediators serve multiple court stations, so assignment in one location affects availability and outcomes elsewhere (Spillover).

Solution:

- Cluster randomization
- Cluster based on mediator-sharing networks

Challenge 2: impractical to randomize into manual vs. algorithmic assignment

Solution:

- Optimization algo vs. simple fair strategy
- Judicial officers interact with identical interface

Key Takeaways for Policy and Practice: Digitize → Analyze → Innovate

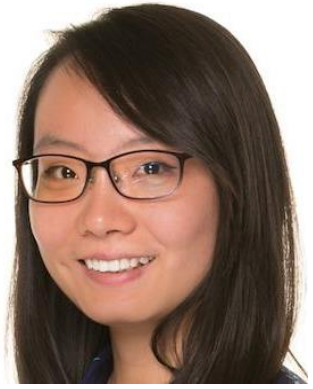
- **Invest in digitization with purpose**: structured data systems unlock long-term value beyond efficiency gains
- **Leverage operational data for real-time insight:** to guide resource allocation, monitor performance, and improve outcomes
- **Embed experimentation into systems:** to enable continuous learning, adaptation, and data-driven improvement
- **Build multidisciplinary teams from the start** so AI/ML tools are not just pilots, but sustained components of evolving operational systems

Project Team

Anja Sautmann, PhD
Senior Economist
World Bank
Development
Research Group
(DECRG)
asautmann@worldbank.org
WA:+1-401-484-1494
Ph: +1-646-709-1974

Sanmay Das, PhD
Professor of
Computer Science
George Mason
University

Antoine Deeb, PhD
Economist
World Bank
Development Impact
Group (DIME)



Wei Lu
Data Scientist and
Software Engineer
World Bank
Development Impact
Group (DIME)

Manuel Ramos Maqueda
Governance Specialist
World Bank Governance
Practice (GGP)

Dídac Martí Pinto
PhD candidate
Economics
University College
London and World
Bank

MD Shafkat Rahman Farabi
PhD candidate
Computer Science
George Mason University

Thank you!

Wei Lu | DIME | World Bank