Incremental AI for Fairer and More Efficient Justice

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Common Perceptions

The digital reform of the judicial system involves transitioning from paper-based to digitized processes; recruiting new professionals, such as data analysts, computer scientists, and designers; promoting digital skills that allow judges, prosecutors, court staff, and other justice practitioners to use and apply digital technologies and tools effectively; improving the collection and management of digital information; and developing systems that allow actors to exchange information.

Recent years have seen a massive increase of data use in global judicial systems. Many countries have turned to electronic case management and filing systems. The shift from paper trails to digital ecosystems on a large scale and the advent of machine learning (ML) tools can create interpretable data from unstructured data, and support the development of predictive models to understand inconsistencies and biases in decision-making and address them with digital interfaces.

Rigorous research on how to improve judicial efficiency is limited, but studies have shown that procedural policy changes, effective case management tools, data-driven interventions that promote accountability, and the expansion of alternative dispute resolution ("ADR") programs can have positive effects on the efficiency and accessibility of justice.

Questions We Should Be Asking

How can AI and humans work together to solve issues such as uncovering the obstacles to judicial efficiency; dissipating the factors contributing to case backlog; and finding viable solutions or experiments that may be useful to deploy in different contexts? Can we build human-centric AI systems that increase efficiency and autonomy, enhance learning, cultivate trust, and reduce inconsistencies in human judgment? Ultimately, how can AI lead to improved delivery, efficiency, and fairness of justice?

Challenging Perceptions

Information technology (IT), AI, and ML are increasingly becoming integrated into global justice systems, a trend accelerated by the COVID-19 pandemic. Big data and digital tools hold the promise of making judiciaries more efficient, increasing access for citizens worldwide, and reducing human biases in judicial decision-making. This promise also carries a responsibility: to assess the use of IT, AI, and ML to ensure they are improving justice systems and leading to downstream benefits. Using AI as a tool for optimizing decisions has shown limited effectiveness. We advocate instead for an incremental approach to AI that seeks to learn, through experimentation, how different tools can support humans in improving judicial outcomes.

The main objective of the DIME research program on Data and Evidence for Justice Reform (DE JURE) is to discover if technological interventions can bolster legal institutions around the world. To explore such possibilities, the DE JURE team combed through thousands of hours of oral arguments, millions of court decisions, tens of millions of hearings, and billions of n-grams (sequences of words) spanning 17 countries and

a century and a half's worth of judicial and administrative data. To date, the curated databases total over 12 terabytes of information (the equivalent of 40,000 episodes of your favorite show).

The program explores several potential data-driven and AI-integrated solutions that we have developed and evaluated in different contexts as part of our global justice program. With digital tools and impact evaluation, these solutions have the potential to support multiple goals of judicial reform: digital transformation, court efficiency, quality and fairness of judicial decisions, and impact on economic outcomes.

Digital Tools

Data-Driven Diagnosis of Court Delays: This low-cost, information-based intervention utilizes a data-driven diagnosis of court delays delivered to court managers and Court User Committees in Kenya and the Chief Justice in Senegal. The intervention reduced adjournments by 20 percent and 40 percent, respectively, increasing the speed of justice and the accountability of justice systems.

Case Management and Smart Assignment Tools: These open source case management tools can facilitate the optimal assignment of cases to mediators and judges, enhance access to justice, reduce court backlogs, and strengthen alternative dispute resolution mechanisms.

Data-Driven Performance Monitoring App: Data-driven performance monitoring apps motivate judges, prosecutors, mediators, and other court actors to comply with performance goals and identify where improvements are most needed.

Decision-Support App for Court Staff: This decision-support app uses natural language

processing to improve the efficiency and consistency of judges' decision-making by enabling them to review a court's, or judge's, past decisions.

Training Tools for Staff: Various extended curricular experiences and light-touch interventions developed by our team have been proven to change attitudes, beliefs, and high-stakes decision-making, which can all improve the efficiency and motivation of court actors.

Impact Evaluation

Court Infrastructure Impact Analysis: Leveraging innovative data sources, we conduct impact analyses of investments in court infrastructure, evaluating the effects on judicial efficiency and firm outcomes. This may assist court systems in making data-driven budget and policy choices that can improve case processing and outcomes.

Impact Analysis on Judicial Speed and Firm Productivity: By merging court and firm data, we evaluate where firm revenue is most responsive to increases in judicial speed. This helps the government identify where the greatest investments in court improvements may have a higher return on investment.

Policy Implications

One of the objectives of DE JURE is to integrate AI into judicial systems to improve decision-making. Using AI to recommend decisions to judges is controversial and potentially counterproductive as they may simply reject the recommendations. For example, a recent study found that implementing such a system could increase disparities: not because the algorithm is biased (in fact, the algorithm's decisions would reduce disparities), but because judges selectively pay attention to the algorithm (Albright 2019).

DIME's DE JURE team instead advocates integrating AI incrementally into high-stakes decision-making through a four-stage process:

Stage 1: AI as a support tool to increase efficiency, reduce bias, and increase autonomy.

Stage 2: AI as a choice monitor that can highlight inconsistencies in human judges.

Stage 3: AI as a coach providing tailored, transparent explanations and optimized feedback to judges.

Stage 4: AI to incorporate peer-based private information to give recommendations.

Below we highlight some of DE JURE's projects at the various stages of integrating AI.

Stage 1—A Web-Based Support Tool for Asylum Seekers

DE JURE is developing a tool to assist asylum seekers and their advocates in making their case for receiving asylum in the United States. Our web-based application can predict the likelihood of an individual being granted asylum by considering information such as their nationality, the hearing location, and the judge. DE JURE is also exploring opportunities to use natural language processing to digitize asylum case data for asylum attorneys to use when building their cases for clients. These support tools reduce the economic and social costs of justice in asylum cases and can be easily extended to other types of cases.

Stage 2—Decision-Support App for Judges

DE JURE has been working with judicial academies that are transitioning from theory to case-based teaching. Case studies allow students to apply and deepen knowledge previously acquired through exposure to real-life scenarios and good

role models. In this context, DE JURE is developing a tool that harnesses the history of past decisions. The platform can leverage the history of a particular judge's written decisions to evaluate how such a judge would decide a similar case compared to a curricular example or to other similar decisions by peer judges. The platform can also identify a judge's behaviors and provide personalized feedback about behavioral changes over time, suggesting how to improve decisions. This approach would augment the efficiency and consistency of judicial decision-making. It could take the judge's own decisions and cases, modify the cases, and indicate how changes in the way they would have been decided would have made a difference in the past. It could also help identify the characteristics of cases that the judge would likely decide differently, given the opportunity.

Stage 3—Data-driven Performance Monitoring that Improves Quality and Efficiency

Many courts worldwide report tracking their performance metrics, but few seem to use that data to inform court management decisions. In Chile, DE JURE partnered with the Department of Institutional Development (DDI) to test whether nudges informing court managers about their performance affected overall court productivity (see figure 4.1). DE JURE and DDI co-designed an online platform that displays performance metrics at the court and judge levels, such as the average case duration, the case clearance rate, and the rate of realized hearings. Through a randomized controlled trial, DE JURE demonstrated that the nudges resulted in behavioral change and improved court productivity. Simplified information presented court managers with social comparison cues that related their performance to that of their peers.

■■·**Figure 4.1** The Impact of Nudges on Court Productivity in Chile
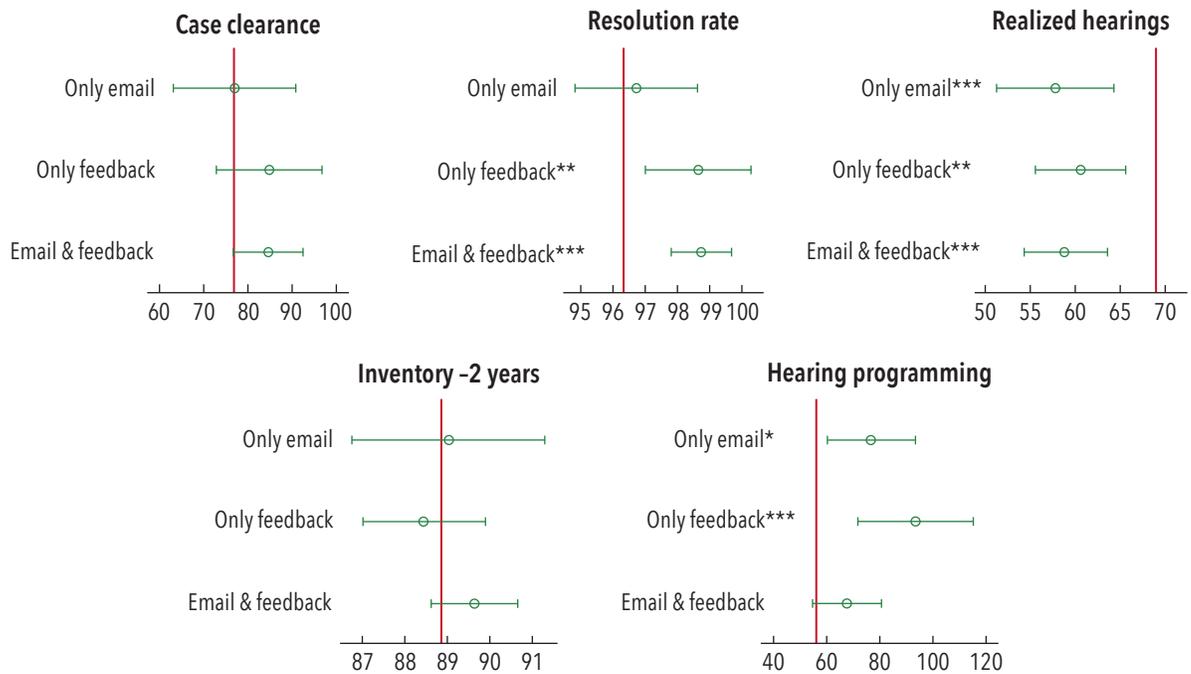
Note: These graphs plot the average effects for three treatments: only email, only feedback, and email and feedback. The x-axis represents the monthly rate for each indicator. The red vertical line shows the mean average for the control group. Confidence intervals are at the 95 percent level, with *** corresponding to a significance level of 1 percent, **5 percent, and *10 percent.

Stage 4—Integrating Peer Recommendations to Improve Performance

DE JURE is collaborating with the Peruvian Ministry of Justice to improve the organizational efficiency of free mediation centers (Asistencia Legal Gratuita, also known a*s* ALEGRA). ALEGRAs offer public defense and victims' defense for free to low-income citizens, mostly in child support, custody, and alimony cases. In this setting, where one agent may have the power to influence the weaker agent to accept their offer, mediators play a crucial role in drafting agreements that minimize conflict. Improving the performance of extrajudicial mediators consequently carries important welfare implications for the most vulnerable. DE JURE is prototyping a tech-based, low-cost platform that allows mediators in ALEGRAs to monitor their performance and improve service quality.

The dashboard also aims to invite mediators to submit, rate, and answer doubts that arise while processing cases. The highest-rated answers will be disseminated among users to improve their performance. Sharing peer advice in an automated, simplified fashion addresses three practical and scholarly findings: (1) ALEGRA mediators frequently have difficulty identifying appropriate mediation strategies, (2) cognitive overload can lead to cognitive errors, and (3) conventional training for professionals is generally less effective than commonly expected.

To summarize the proposed incremental AI: the first stage (Predicted Self) reduces bias and increases autonomy; the second stage (Choice Monitor) predicts errors and uses nudges to direct attention; the third stage (Explainable AI) points out inconsistencies and delivers performance feedback; and the fourth stage (Community of Experts) incorporates peer-based, private

information into its behavioral recommendations. DIME believes that deploying such technological solutions can improve the quality and efficiency of judicial systems and, by doing so, increase the welfare of, and trust in, the state by vulnerable and marginalized populations.

This case study is based on a collection of work produced by DIME's DE JURE team that draws from the following working papers and published articles:

- Carrillo, Paloma, Daniel Chen,* Manuel Ramos-Maqueda,* and Bernardo Silveira. 2021. "Information Provision and Court Performance: Experimental Evidence from Chile." Working Paper.
- Chen, Daniel L.* 2020. "Incremental AI." NBER Working Paper.
- Chen, Daniel L.,* Tobias J. Moskowitz, and Kelly Shue. 2016. "Decision Making Under the Gambler's Fallacy: Evidence from Asylum Judges, Loan Officers, and Baseball Umpires." The Quarterly Journal of Economics 131 (3): 1181–1242.
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- Ramos-Maqueda, Manuel,* and Daniel Chen.* 2021. "The Role of Justice in Development: The Data Revolution." Policy Research Working Paper 9720, World Bank, Washington, DC.

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*Development Impact Evaluation (DIME), World Bank.