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The Impact of Online Dispute Resolution on the Judicial Outcomes in India

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Abstract: This study examines the impact of online dispute resolution (ODR) on the efficiency of the Indian judiciary, focusing on an online platform used in Lok Adalats, community-based legal forums in India. The study addresses the challenges posed by India's extensive case backlog and the additional strain caused by the COVID-19 pandemic. It employs a Randomized Control Trial (RCT) methodology to evaluate the integration of chatbots in ODR processes. The findings suggest that chatbot integration maintains resolution time while enhancing user engagement. This research highlights the potential of leveraging technology to incorporate procedural justice principles, thereby improving public trust and the effectiveness of the legal system.

Keywords: Indian judiciary; case backlog; chatbot mediation; Randomized Controlled Trial; online dispute resolution

JEL Classification: K0; C93; O33; D73

1 Introduction

1.1 Case Backlogs in the Indian Judiciary

Overburdened judiciaries with large case backlogs routinely delay justice in developing countries (Djankov et al. 2003; Marciano et al 2019). This not only imposes direct constraints on those who are seeking justice but also undermines public trust in the judiciary, markets, and broader institutions (Amirapu 2021). The costs of delayed justice are particularly high for those who are poor and marginalized. The

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global Covid-19 pandemic intensified these issues. While some judiciaries were able to adopt remote work technologies (Ramos-Maqueda and Chen 2021), in developing countries, the limited access to digital technologies, erratic internet connectivity and strong paper-based filing systems made this transition difficult, resulting in further backlogs, greater burdens on justice workers and hindering access to justice for citizens.

In this project, we evaluate an intervention aiming to reduce backlog and improve judicial efficiency in India. Even before the pandemic, India faced enormous judicial backlogs. In 2018, NITI Aayog, the central government think tank of India, noted that it would take 324 years to clear the backlog of cases at the current pace. Even though India has steadily climbed in the ranking for Ease of Doing Business (currently ranked 63rd), it continues to be at 163 out of 190 in enforcing contracts. The cost of enforcing contracts has been estimated to be as high as 31 % of the average claim value, as compared to 21.5 % in OECD High Income Countries and 16.2 % in China. The backlog of cases has gone up by at least 20 % since the pandemic began and currently stands at more than 38.9 million cases. The total number of pending cases with High courts went from 4,684,354 in 2019 to 5,642,567 in December 2020. A similarly concerning statistic is evident at the District courts as well, with an 18.2 % increase in the total number of pending cases, increasing from 31,448,888 in November 2019 to 37,183,419 in January 2021. Furthermore, Supreme Court cases increased from 60,469 in March 2020 to 66,727 in March 2021. This steep rise in cases has been among the sharpest inclines since case-specific data became shared with the public in 2013.[1] This highlights the need to address the efficacy of justice at the bottom of the pyramid: alternative dispute resolution, mediation, and conciliation.

1.2 The Role of Lok Adalats in Improving Case Clearance

India has taken several steps towards streamlining its judicial processes and addressing many systemic inefficiencies. In 1982, cognizant of the rising burden on the judiciary, Alternative Dispute Resolution (ADR) was introduced. This was termed as 'Lok Adalat' and was built on the traditional village approach of dispute resolution. Through Lok Adalat, parties adopted a conciliatory approach during both pre-litigation and litigation stages. Eventually, the National Legal Services Authority (NLSA) was constituted under the Legal Services Authorities Act (1987) to provide free Legal Services to weaker sections of society and to organize Lok

1 Pandemic Increases Pendency of Cases, Data from Ministry of Law & Justice, (March 31, 2021), https://www.newsbytesapp.com/news/india/coronavirus-pandemic-increases-pendency-of-cases/story.

Adalats for amicable settlement of disputes. As of September 30, 2015 more than 1.5 million Lok Adalats had been organized in the country since its inception, and more than 82.5 million cases had been settled by the mechanism.[1] Notwithstanding the evidence, Lok Adalats have suffered from a serious shortage of resources that has prevented adequate administration of justice despite their demand (Zainulbhai 2011; Galanter and Krishnan 2003). Zainulbhai (2011) also points towards the structural flaws in Lok Adalats that have caused access to the system to be intermittent and difficult for the public.

Under this context, technology that enables the provision of virtual legal services to resolve disputes holds great potential. The COVID-19 pandemic led to a much-needed change in the functioning of Lok Adalats. During the pandemic, NLSA suspended the in-person Lok Adalats and shifted to online Lok Adalats. Between June and October 2020, a total of 27 e-Lok Adalats were conducted in 15 states, wherein 483,000 cases were taken up and 251,000 cases disposed of, resulting in the settlement of INR 1,409 million.[2] While online Lok-Adalat is being celebrated for saving cost, its effectiveness, much like offline Lok Adalat, remains untested. More importantly, it has been questioned whether the online Lok-Adalat's focus on swift delivery comes at the cost of just and fair outcomes.[3]

1.3 Online Dispute Resolution to Complement the Lok Adalats

The context of online Lok Adalats provided a unique opportunity to evaluate the effectiveness of these online dispute resolution services. We proposed an intervention in partnership with Sama, an organization that provides an innovative platform for online dispute resolution services. Founded in 2015, Sama was recognized as one of the fastest platforms for online dispute resolution.[4] It is also the only online Dispute Resolution platform recognised by the Ministry of Law and Justice. Since the start of the pandemic Sama has executed 4 online Lok Adalats by partnering up with state Legal Service Authorities across India. In the process, it has worked with more than 100,000 cases. Furthermore, Sama also provides its services to e-commerce and insurance platforms, mediating 2000 cases for them on a weekly basis. By leveraging Sama's broad reach and infrastructure we were able to conduct an RCT to study the efficacy of online mediation.

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2 E-Governance in Rural India: Need of Broadband Connectivity Using Wireless Technology https://www.scirp.org/html/13-6801053_5833.htm.

3 National Legal Service Authority website https://nalsa.gov.in/lok-adalat.

4 E-Lok Adalats enabled delivery of justice at litigants' doorstep during covid pandemic: Ministry of Law & Justice: https://government.economictimes.indiatimes.com/news/digital-india/e-lok-adalats-enabled-delivery-of-justice-at-litigants-doorstep-during-covid-pandemic-ministry-of-law-justice/79387933.

We evaluate the impact of online dispute resolution using a chatbot on the efficiency and productivity of the judicial processes across the states in India. We assess whether the usage of chatbots can complement or supersede the current method of using human agents for online dispute resolution (Kumar and Singh 2024; Giacalone 2025). We also assess its potential to support the Indian Judiciary in reducing case backlog and increasing their citizens' access to justice by comparing the effectiveness of the different forms of online mediation to understand what feature works best in the context of judicial processes and Lok Adalats in India. We also look into the impact of these features on user engagement that can potentially lead to improved trust in judicial institutions and legal access among the citizens.

2 Data and Methodology

We piloted a chatbot to resolve traffic violation disputes online and estimate its impact on user engagement. In a previous Lok Adalat held on 12th March 2022, Sama (an online Dispute Resolution platform recognized by India's Ministry of Law and Justice), in partnership with the Maharashtra State Legal Service Authority (MSLSA), managed more than 5.3 million traffic violation cases across 37 districts of Maharashtra, recovering INR 710 billion for the state. Sama makes use of a WhatsApp human agent feature to help guide users in resolving traffic violation cases.

In the first phase of the Lok Adalat held in September 2021, Sama, in addition to the WhatsApp feature, used a customer care helpline in the form of IVR (Interactive Voice Response) to resolve 1.1 million traffic violation disputes. These interactions were recorded in 400 audio files. We transcribed these audio files and ran Natural Language Processing algorithms to generate clusters of questions across various themes. We used these ML-generated questions along with the FAQs provided by Sama to construct the automated chatbot. The chatbot is designed to quickly identify the user's query and accordingly prompt questions and instructions that help them navigate and resolve their legal disputes, in our case, traffic violations.

We randomized the violations across five treatment arms to compare their effects on the case settlement duration and other outcome variables of interest. All disputants receive the notice via SMS that provides the URL to the Sama website, whereby they are offered different features to assist with their queries based on the treatment they were assigned. Treatment arm 1 offers only the chatbot feature. Disputants can ask questions by clicking on the link to the chatbot. Treatment arm 2 is an Interactive Voice Response (IVR) where the disputants are provided with a telephone number that they can call for assistance with cases. The number has

pre-recorded responses based on the questions chosen by the disputants. Treatment arm 3 is a combination of IVR and WhatsApp. Disputants were first given the option for an IVR call, and later on, if the user is not satisfied with the response, the option of a WhatsApp number using which they could interact with a Sama case manager (agent) who can answer their unresolved questions regarding the traffic violation. Treatment arm 4 was a combination of the Chatbot and WhatsApp. Disputants first use the chatbot feature and then, if unsatisfied, are offered the option of a WhatsApp number to interact with an agent to resolve their disputes. The control group received only the WhatsApp agent feature since this is the current approach used by Sama to resolve disputes remotely.

Outcome variables of interest include duration of the notice, action count, and page count in the Sama web page interface for each of the treatment arms. The action counts are obtained by using hotjar, a third-party application that allows websites to track user activity such as clicks, text box inputs, and dropdown menu selections (termed 'actions') to measure user engagement with the website features (Lehmann et al. 2012; Tsai and Men 2013). The page counts, also obtained via hotjar, essentially describe how many webpages of information were viewed by the user. The duration of the notice indicates the speed of resolution of the disputes. The action and page counts can be used as a measure of user engagement and responsiveness. The webpage is designed in the same format for each of the treatment arms to ensure that there are no inherent differences in user activity across treatment arms due to the nature of engagement. In otherwords, it takes almost the same user activity to access the Whatsapp only feature as that of the Whatsapp and chatbot treatment. This ensures that the differences in outcomes observed across the treatment groups are attributable to their own features and not in the way they have to be accessed. Table 2 shows covariate balance for each of the treatment groups across each of the outcomes. The coefficients are extremely small in magnitude and show no statistical significance, indicating that there is no correlation between the user-related covariates and the treatment groups.

Our empirical specification uses an OLS estimation as follows:

$$Y_i = \beta_1 * \text{Treat1}_i + \beta_2 * \text{Treat2}_i + \beta_3 * \text{Treat3}_i + \beta_4 * \text{Treat4}_i + \text{Controls}_i + c + \varepsilon_i \quad (1)$$

where Y_{i} is the outcome variable of interest for the disputant 'i'. Treat1_{i} through Treat4_{i} are dummy variables indicating whether the disputants were assigned to the corresponding treatment arms (excluding the control); Controls include user specific attributes such as the type of device, screen size, browser and OS, claim amount and district fixed effects; c refers to the regression constant, and ε_{i} is the error term.

3 Discussion of the Results

The results from the regressions using the specification (1) are displayed in Table 1. We have tabulated both the total and mean of outcome variables for each disputant. The 'total' variables are measured across all the sessions related to a particular dispute for the user. The 'mean' variables measure the outcomes for each session where the user (disputant) accesses the corresponding treatment offered on the

Table 1: Effect of online dispute resolution.

	(1) Total duration	(2) Mean duration	(3) Total action count	(4) Mean action count	(5) Total page count	(6) Mean page count
Chatbot	9.289	2.549	0.220	0.139	0.112*	0.0738*
	(11.44)	(6.985)	(0.373)	(0.227)	(0.0560)	(0.0291)
IVR	9.537	6.161	1.014	0.866	0.0556	0.0175
	(11.34)	(7.146)	(0.985)	(0.941)	(0.0561)	(0.0280)
IVR + Whatsapp	16.49	9.719	0.348	0.0707	0.152*	0.0787**
	(11.44)	(7.280)	(0.375)	(0.223)	(0.0622)	(0.0302)
Chatbot + Whatsapp	24.54*	17.18*	0.559	0.377	0.146*	0.112***
	(11.71)	(7.573)	(0.358)	(0.227)	(0.0593)	(0.0335)
Claim amount (thousandths of INR)	−7.67***	−4.38***	−0.329***	−0.169**	−0.0283**	−0.0086
	(1.97)	(1.20)	(0.0861)	(0.0634)	(0.00984)	(0.00513)
Constant	830.6***	637.6***	6.702*	5.315**	1.367***	1.255***
	(122.3)	(91.51)	(2.626)	(2.008)	(0.295)	(0.182)
N	11,694	11,694	11,694	11,694	11,694	11,694
adj. R-sq	0.096	0.115	0.004	−0.002	0.037	0.014

The standard errors are shown within parentheses and are clustered at the complaint ID level. The coefficients are shown to be significant at $^{*}p < 0.05$ $^{**}p < 0.01$ amd $^{***}p < 0.001$ levels. The total values refer to the outcomes measured per user across all sessions and the mean values refer to the outcomes measured per session per user. Duration variables refer to the dwell time of the user sessions, actions count refers to the no. of user clicks and other interactions with the platform. The page counts refer to the no. of pages viewed by the user through the interaction with the platform. The Chatbot treatment is offered only the chatbot services, while the IVR treatment group is offered only the IVR services. The Chatbot + WhatsApp treatment offers the option of interaction with human agents via WhatsApp on user demand after using the chatbot. Likewise for the IVR + WhatsApp group. The constant term refers to the control group where users are offered only the option of interacting with human agents through WhatsApp. Claims Amount refers to the original amount sought for payments over the traffic violation. The other controls used include the browser, device and operating system of the users and district fixed effects.

Table 2: Balance table for covariates.

Outcome	Chatbot	IVR	IVR + WhatsApp	Chatbot + WhatsApp
Total duration	−7.8100E-06	1.5400E-05	−1.6300E-06	1.1700E-05
	(2.7700E-05)	(2.8500E-05)	(2.7500E-05)	(2.9100E-05)
Mean duration	−1.6000E-05	6.1100E-06	8.4400E-06	3.9300E-05
	(4.0300E-05)	(4.1600E-05)	(4.0700E-05)	(4.2900E-05)
Total action count	3.8800E-04	−9.8000E-05	−9.1000E-04	−4.6000E-04
	(1.7110E-03)	(1.7190E-03)	(1.7150E-03)	(1.7720E-03)
Mean action count	1.4000E-05	−3.9200E-03	7.8200E-04	3.7990E-03
	(3.0760E-03)	(3.0800E-03)	(3.1000E-03)	(3.3210E-03)
Total page count	−7.9000E-04	7.2450E-03	2.4500E-06	−8.9000E-03
	(8.5990E-03)	(8.6250E-03)	(8.8690E-03)	(8.5770E-03)
Mean page count	−2.0120E-02	8.1440E-03	3.0820E-02	−1.0740E-02
	(2.3540E-02)	(2.3943E-02)	(2.7357E-02)	(2.4050E-02)

Table 2 shows the covariate balance for each of the outcome variables used in our main specification in Table 1. Since the control variables are high dimensional, we have computed the y-hat i.e. treatment predicted by the controls and then regressed each of the y-hat with each of the outcome variables to demonstrate covariate balance. The covariates used include user specific attributes such as the type of device, screen size, browser and OS, claim amount, and district fixed effects. All the standard errors are shown within parentheses and are clustered at the complaint ID level. The coefficients are shown to be significant at $^{*}p < 0.05$, $^{**}p < 0.01$, and $^{***}p < 0.001$ levels.

Sama webpage. The control group is interaction with human agents using WhatsApp and is indicated by the value of the constant term in our regressions (Table 3 displays summary statistics for the key variables in our regressions).

We see that the duration, action count, and page counts all decrease as the amount to be paid by the users increase, indicating a faster resolution due to increasing stakes at higher claim amounts.

Table 3: Summary statistics.

Variable	Count	Mean	SD	Min	Max
Chatbot	11,694	0.1978	0.3983	0	1
IVR	11,694	0.1968	0.3976	0	1
IVR + WhatsApp	11,694	0.2004	0.4003	0	1
Chatbot + WhatsApp	11,694	0.2087	0.4064	0	1
WhatsApp	11,694	0.1963	0.3971	0	1
Claim amount (INR)	11,694	1,311.411	1,572.11	1	25,000
Device screen area (pixels)	11,694	276,704.9	148,516.4	52,920	2,150,400

Next, we see from columns (5) and (6) that having the chatbot feature alone as well as to assist and complement the human agents that act as WhatsApp responders increases the page counts from the users. An increase in page count essentially indicates that the users can obtain more detailed information on their queries, and a hike in action counts could indicate that the users are more interested and engaged in the interaction. However, we do not observe discernible differences in action counts.

Interestingly, in columns (1) and (2), where we are looking at the duration of the engagement, the use of the chatbot feature did not really affect the resolution time. This implies that the use of chatbots in ODR improves the user experience at no cost to the speed of resolution of cases. These results suggest the users were better able to express their voice in the case proceedings without significant loss of judicial state capacity.

4 Conclusion

Although our study mainly focuses on traffic violation cases in the Lok Adalat courts, the results are transmissible to various other contexts within the Indian judiciary wherein AI-based chatbots offer the potential to increase user engagement and transparency, and consequently improve the public trust in judicial proceedings (Rabinovich-Einy and Katsh 2021). The results from our study show the positive effects of the use of chatbots on user engagement at no additional cost to the duration, which is an essential feature in aiding the Indian judiciary that is burdened by case backlogs (NJDG Report 2024) and inaccessibility to relevant information (Daksh India 2021). Furthermore, increased engagement contributes to the user being able to vocalize their grievances or queries and receive clarifications with ease.

Having a voice in court is an essential element of procedural justice, a foundational principle in legal theory that suggests fairness in legal proceedings is crucial to achieving just outcomes. The utility of people getting their voice in court is multifaceted: it empowers individuals, provides a platform for presenting evidence, and contributes to the legitimacy and public acceptance of legal decisions. When people feel they have been heard and their views considered, it enhances the perceived legitimacy of the legal process and the acceptance of its outcomes. This, in turn, contributes to the stability and effectiveness of the legal system.

From a computer science perspective, integrating these principles can help in developing technologies and systems that facilitate access to justice. For example, digital platforms can be designed to ensure that individuals can effectively convey their narratives, evidence can be accurately recorded and analyzed, and the transparency of the legal process is maintained. Additionally, natural language

processing (NLP) and machine learning (ML) can be used to analyze and interpret the information presented, aiding in the comprehensive and impartial evaluation of cases.

In conclusion, recognizing and ensuring the utility of people's voice in court is pivotal for achieving justice. Integrating these principles in the design and application of legal technologies can significantly enhance the functionality and fairness of the judicial system. This intersection of computer science and legal theory opens new avenues for innovation, enabling the creation of more accessible, equitable, and efficient legal processes.

References

Amirapu, A. 2021. "Justice Delayed Is Growth Denied: The Effect of Slow Courts on Relationship-specific Industries in India." *Economic Development and Cultural Change* 70 (1): 415—51.

Daksh India. Access to Justice. https://www.dakshindia.org/access-to-justice/ (accessed July 3, 2025).

Djankov, S., R. L. Porta, F. Lopez-De-Silanes, and A. Shleifer. 2003. "Courts." *The Quarterly Journal of Economics* 118 (2): 453—517.

Galanter, Marc, and Jayanth K. Krishnan. 2003. "Bread for the Poor: Access to Justice and the Rights of the Needy in India." *HAStIngS lJ* 55: 789.

Giacalone, M. 2025. "AI and the Future of Private Dispute Resolution Mechanisms." *SSRN* 5083207. https://doi.org/10.2139/ssrn.5083207.

Kumar, Rajendra, and Banshi Dhar Singh. 2024. "The Rise of the Robo-Mediator: AI's Transformative Role in Alternative Dispute Resolution." *White Black Legal Journal* 3 (1): 1—11.

Lehmann, J., M. Lalmas, E. Yom-Tov, and G. Dupret. 2012. "Models of User Engagement." In *User Modeling, Adaptation, and Personalization: 20th International Conference, UMAP 2012, Montreal, Canada, July 16—20, 2012. Proceedings*. Berlin Heidelberg: Springer.

Marciano, A., A. Melcarne, and G. B. Ramello. 2019. "The Economic Importance of Judicial Institutions, Their Performance and the Proper Way to Measure Them." *Journal of Institutional Economics* 15 (1): 81—98.

Zainulbhai, Tameem. 2011. "Justice for All: Improving the Lok Adalat System in India." *Fordham Int'lL.J.* 35: 248.

National Judicial Data Grid. 2024. https://njdg.ecourts.gov.in/njdg_v3/ (accessed July 3, 2025).

Rabinovich-Einy, O., and E. Katsh. 2021. "Artificial Intelligence and the Future of Dispute Resolution: The Age of AI-DR, "Artificial Intelligence and the Future of Dispute Resolution: The Age of AI-DR"". In *Online Dispute Resolution: Theory and Practice*, edited by Mohamed Abdel Wahab, Daniel Rainey, and Ethan Katsh. Eleven International Publishing. forthcoming, 2021.

Ramos Maqueda, Manuel, and Daniel L. Chen. 2021. *The Role of Justice in Development : The Data Revolution*. Policy Research Working Paper; No. 9720. Washington, DC: World Bank. © World Bank. License: CC BY 3.0 IGO. https://openknowledge.worldbank.org/handle/10986/35891 (accessed July 3, 2025).

Tsai, W. H. S., and L. R. Men. 2013. "Motivations and Antecedents of Consumer Engagement with Brand Pages on Social Networking Sites." *Journal of Interactive Advertising* 13 (2): 76—87.