

NEHA SHARMA

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EDUCATION

Northwestern University

Ph.D, Operations Management, Kellogg School of Management

- June 2023 (Expected)

M.S. Statistics, Department of Statistics

- June 2023 (Expected)

Delhi College of Engineering, Delhi

- June 2013

Bachelor of Technology, Electrical and Electronics Engineering.

RESEARCH INTERESTS

- *Areas:* Online Platforms, Urban Mobility, Sustainability, Non profit operations
- *Methodologies:* Game Theory, Data-Driven Modeling, Stochastic Modeling, Pricing and Revenue Management, Statistical Learning

PUBLICATIONS

- [“Payment for Results: Funding Non-Profit Operations”](#) - N. Sharma, S. Devalkar, and M. Sohoni. *Production & Operations Management* 2020.

WORKING PAPERS

- [“Structuring Online communities”](#) - N. Sharma, G. Allon, A. Bassamboo. *Under Minor Revision at M&SOM*
 - Finalist for IBM Service Science Best Student Paper.
 - Won second place in poster competition at CMU Informs YinzOR 2022.
 - Invited for Fast-Track Publication at M&SOM.
 - Invited for presentation at M&SOM SIG (2022).
 - Media coverage - [Kellogg Insight](#)
- [“List now or later? An equilibrium analysis of advance-booking platforms”](#) - N. Sharma, S. Sinha, M. Sohoni, and A. Bassamboo. *R&R at Management Science*.
 - Finalist for IBM Service Science Best Cluster Paper.
 - Won second place in flash presentation conference at CMU Informs YinzOR 2022.
 - To appear in [Kellogg Insight](#).
 - To appear in [ISB Research Bytes](#).
- [“Scaling sharing platforms with supply constraints with lease-to-earn contracts”](#) - N. Sharma, M. Sohoni, and A. Bassamboo. *Under Revision, Target M&SOM*. [Slides \(previous version\)](#), [Talk \(previous version\)](#).
- [“Should the Platform Manage Driver Decisions under Traffic Congestion?”](#) - N. Sharma, C. Bandi. *Under Revision, Target Management Science*. [Slides \(previous version\)](#), [Talk \(previous version\)](#).
- [“Improving reliability in asset sharing platforms”](#) - N. Sharma, M. Sohoni, M. Shukla (Zoomcar), A. Bassamboo, and S. Roy (Zoomcar). *Draft Under Preparation*.

TEACHING EXPERIENCE

- TA for MBA courses, OPNS-430, OPNS-440, OPNS-455 Operations Management (2018-2020).
Instructors: Sunil Chopra, Achal Bassamboo, Maria Ibanez, and Tarek Abdallah.
- TA for Executive MBA courses OPNX-430, Operations Management (2019) and OPNX-454 Strategic Decisions in Operations (2019). *Instructor: Sunil Chopra.*
- TA for MBA course, OPNS-450, Analytical Decision Modeling (2020). *Instructor: Chaithanya Bandi.*
- TA for MBA course, OPNS 451, Analytical Decision Modeling: R (2021).
Instructor: Rob Bray. Mean - 3.98/5, Median - 4.5/5.
- TA for MBA course, OPNS 951, Humanitarian and Non-Profit Operations (2021).
Instructor: Karen Smilowitz.
- TA for MBA course, MECN-441, Competitive Strategy and Industrial Structure (2021).
Instructor: Joshua Mollner.
- Course Design for Digital Operations. *Instructors: Jan A. Van Mieghem & Achal Bassamboo.*

INVITED TALKS AND PRESENTATIONS

- [“Structuring Online communities”](#) - Sharma, Allon, Bassamboo. *Under Minor Review at M&SOM.*
 - Young Seminar Series @ Rotman School of Management, University of Toronto, March 2023.
 - Lyft Rideshare Labs (NYC), Feb 2023.
 - Scheller (Georgia Institute of Technology), Zicklin (Baruch College, CUNY), University of Wisconsin Madison, Said Business School (University of Oxford), College of Management of Technology (EPFL, Switzerland), 2023.
 - Krannert (Purdue University), Simon Business School (University of Rochester), Graduate School of Business (UC Davis), School of Business (UIC, Chicago), Tuck (Dartmouth), Graduate School of Business (UC Irvine), University of Texas Dallas, School of Business (George Washington University), London Business School, Indian School of Business, The Wharton School (University of Pennsylvania), University of New Hampshire, 2022.
 - MOILS Seminar @ Stern School of Business, NYU, 2022.
 - INFORMS Annual Meeting 2022, 2021, 2020.
 - Presented at Young Researchers Workshop 2022 @ Cornell, Ithaca, NY (poster).
 - CMU Informs YinzOR 2022 Poster Competition.
 - M&SOM SIG @ Munich, 2022.
 - Marketplace Innovation Workshop, 2022.
 - NYC OPS Day @ Cornell Tech, 2022.
 - POMS Conference, 2022.
 - RMP Conference, 2022.
 - M&SOM Conference, 2021.
- [“List now or later? An equilibrium analysis of advance-booking platforms”](#) - Sharma, Singha, Sohoni, and Bassamboo. *Under Review at Management Science.*
 - INFORMS Annual Meeting 2022.
 - Presented at CMU Informs YinzOR 2022 Flash Talk Competition.
 - Presented at M&SOM Conference 2022.
 - RMP Conference 2022.

- Marketplace Innovation Workshop, 2022.
- NYC OPS Day @ Cornell Tech, 2022.
- POMS Conference 2022.
- TSL, IIM-A, 2021.
- “Scaling sharing platforms with supply constraints with lease-to-earn contracts” - Sharma, Sohoni, and Bassamboo. *Under Revision*.
 - INFORMS Annual Meeting 2021.
 - POMS Conference (2022, 2021),
 - M&SOM Conference 2021.
 - RMP Conference 2021.
 - Marketplace Innovation Workshop Conference 2021.
- “Should the Platform Manage Driver Decisions under Traffic Congestion?” - Sharma, Bandi, and Sohoni. *Under Revision*.
 - Presented at INFORMS Annual Meeting (2019 @ Seattle, WA, 2020).
 - M&SOM Conference 2020.
 - ICSS 2020.

INDUSTRY COLLABORATION

ZoomCar, India, September 2019 - present
 Designing supply contracts and pricing to improve revenue
 Allocating cars to customers to decrease stock-outs and enhance customer experience
 Analyzing renter’s driving behavior and designing insurance contracts to improve driving behavior.

Turno, India, March 2022 - present
 Designing market Learning battery depreciation with varying external conditions and user behavior through real-time experiments.

WORK EXPERIENCE

Indian School of Business, Hyderabad July 2015-July 2017
Research Associate, Operations Management
 Worked with Professors M. Sohoni & S. Devalkar on the paper, Payment for Results: Funding Non-Profit Operations

Maruti Suzuki India Limited, Gurgaon July 2013-July 2015
Assistant Manager, New Product Development, Research and Development
 Worked on developing prototypes, design and validation of new processes, and managing design changes

RELEVANT SKILLS

Python, Gurobi, R, Julia, C++, MATLAB, Mathematica, SQL, L^AT_EX.

REFERENCES

Achal Bassamboo

Professor of Operations
Kellogg School of Management, Northwestern University
Email: a-bassamboo@kellogg.northwestern.edu

Gad Allon

Professor of Operations, Information and Decisions
Wharton at University of Pennsylvania
Email: gadallon@wharton.upenn.edu

Milind Sohoni

Professor, Operations Management
Indian School of Business, Hyderabad
Email: milind_sohoni@isb.edu

“[Structuring Online communities](#)” - N. Sharma, G. Allon, A. Bassamboo. *Under Review at M&SOM SIG Fast-track.*

- We model an online Question and Answer community where users can ask questions and other more knowledgeable users can answer their questions. We study the users’ decisions to join and participate in the community and explore community moderation as a potential lever that controls the effort exerted by users in asking a question. We find that increasing the user’s cost of asking questions does not always decrease the size of the community. Instead, a higher cost improves the proportion of questions answered and consequently lowers the rate of users leaving the platform unsatisfied. We also link the users’ participation patterns with the community’s underlying network structure. We theoretically validate the empirical studies that only a core-periphery network structure can emerge in such communities.

“[List now or later? An equilibrium analysis of advance-booking platforms](#)” - N. Sharma, S. Sinha, M. Sohoni, and A. Bassamboo. *Under Review at Management Science.*

- We study sharing platforms that allow guests to reserve assets ahead of service. On such platforms, ‘hosts’, asset owners who rent their assets, *commit to the assets’ availability* by ‘listing’ it for a future time. We find *empirical evidence* of hosts’ strategic decision regarding whether to list early or later from one of the largest car-sharing platforms in India. Given that platforms use dynamic pricing and share revenue with the hosts, they may not always prefer listing early. We use a two-period game-theoretic framework to model such a platform. We first analyze the platform’s equilibrium supply and service level for guests under the widely used revenue-share contract. We theoretically show that there always exists a region where no hosts list their assets early. Our results show the limitations of revenue-share contracts in sharing platforms.

“Scaling sharing platforms with supply constraints with lease-to-earn contracts” - N. Sharma, M. Sohoni, and A. Bassamboo. *Under Revision.* [Slides \(previous version\)](#), [Talk \(previous version\)](#).

- Many asset-sharing platforms face significant supply shortages. These supply shortages can be attributed to low asset ownership rates in developing markets, high cost of sharing due to regulations, or competition from other sharing platforms. Recently, some platforms have introduced *lease-to-earn* contracts to increase their supply base. Under lease-to-earn contract, any individual can lease an asset from the platform at a fixed recurring fee. These lessees can now share this asset back on the platform when they are not using it. Upon sharing the asset the lessees, like the asset-owners, get a share of revenue of the revenue earned by their asset. We study such contracts using a sequential game-theoretic model where the platform chooses the recurring fixed fee and revenue share. The asset-owners choose whether to join the platform and share the asset, while all the other individuals decide whether to lease the asset from the platform and this asset. Our main result is the existence of dormant lessees, who use the asset for their personal use all the time and never share it on the platform. Moreover, we find that the existence of dormant lessees is optimal even when platform charges a fee for personal use of the asset from the lessees. We find empirical validation of our main result in the real data from the largest car sharing platform in India that offers such lease-to-earn contract in around 50 cities in India. We observe that 5-15% of the lessees are *dormant*.

“[Should the Platform Manage Driver Decisions under Traffic Congestion?](#)” - N. Sharma, C. Bandi. *Under Revision.* [Slides \(previous version\)](#), [Talk \(previous version\)](#).

- Recently, ride-sharing platforms have been in the spotlight for exploiting drivers and increasing traffic congestion in cities. Some platforms like Via in U.S. and Ola in India are now experimenting with a business model where drivers’ actions are completely controlled by the platform in return for a fixed hourly wage. In this paper, we study this setting to find how having more control over its supply impacts the platform’s operational efficiency, traffic congestion, and overall profits. We model the city as a network of multiple nodes with riders and drivers. First, we consider the traditional decentralized platforms where drivers make their own decisions and get paid based on the trips completed. We then analyze a centralized platform where drivers do not make any decisions and get paid according

to the hours they are active on the app. We compare these two operational regimes in terms of the platform's profits and delay costs for drivers due to traffic congestion. First, we obtain an upper bound on the difference in operational efficiency for the two regimes. We also find conditions where the platform's profits are higher under one regime over the other. We further analyze how the profits and delay costs are affected by the topology of the network.

“Improving reliability in asset sharing platforms” - N. Sharma, M. Sohoni, M. Shukla (Zoomcar), A. Bassamboo, and S. Roy (Zoomcar). *Draft available upon request.*

- We studied the inventory problem of a car-sharing platform in India. The platform receives about 75,000 booking inquiries in a day and books about 3000 from these inquiries. However, about 10-30% of the inquiries are turned away due to stockouts depending on the city. In this paper, we examine the problem of inventory allocation in advanced booking platforms and how simple search is also impacted by the allocation decisions of the platform. Further, the primary source of inefficient use of available capacity is not the demand uncertainty but the sequence in which the demand arrives. We also find that usual utilization maximizing allocation algorithms prove costly as they make some cars depreciate too fast, impacting the overall supply in the three-year horizon. We find an allocation algorithm that minimizes the depreciation costs, ensures equity in asset utilization, and allocates better cars to high-value customers. We see a decrease of 25-30% decrease in stock-outs for the platform

“Payment for Results: Funding Non-Profit Operations” - N. Sharma, S. Devalkar, M. Sohoni, *Production & Operations Management 2020.*

- Payment for results (PfR) funding approach, where donors reimburse the non-profit organization (NPO) based on outcomes, is being increasingly adopted in the non-profit sector. In this study, we use a sequential game to model the interaction between the donor and the NPO, with the donor as the first mover. This model captures how PfR funding is typically implemented in practice using social impact bonds (SIB), wherein social investors provide the upfront funding needed by the NPO to implement the project. We find that higher targets set by the donor do not necessarily translate to higher expected utility or expected benefit delivered under PfR. When comparing the performance of PfR and traditional funding (TF) mechanisms, we find that the donor typically has a higher expected utility under the PfR mechanism when the probability of a negative outcome shock is either high or low and is better off using the TF approach otherwise. Interestingly, we find that for a large range of parameter values, there is a mismatch between the approach that gives a higher expected utility to the donor and the approach that maximizes the expected social benefit delivered.