

 **Columbia Business School**
W. Edwards Deming Center
for Quality, Productivity,
and Competitiveness

Study Tour to Target and Martin Guitar

Philadelphia and Nazareth, PA

May 19th and 20th, 2025

Participants

Priyank Agrawal

PhD Candidate, Industrial Engineering and Operations Research (IEOR) Department, Columbia University

Jerry Anunrojwong

PhD Candidate, Decision, Risk, and Operations (DRO) Division, CBS

Santiago Balseiro

Associate Professor of Business, DRO Division, CBS

Omar Besbes

Vikram S. Pandit Professor of Business, DRO Division, CBS

Nicole DeHoratius

Professor of Professional Practice, DRO Division, CBS

Adam Elmachtoub

Associate Professor, IEOR Department, Columbia University

Conor Hassett

Business Development Manager, Brooklyn Navy Yard (BNY)

Caroline Jagtenberg

Visiting Professor, IEOR Department, Columbia University

Hannah Li

Assistant Professor of Business, DRO Division, CBS

Hongyao Ma

Assistant Professor of Business, DRO Division, CBS

Molly Muench

Senior Associate Director, W. Edwards Deming Center, CBS; Executive MBA Candidate, CBS

Angela Quintero

Managing Director, W. Edwards Deming Center, CBS; Adjunct Assistant Professor, DRO Division, CBS

Nachum Sicherman

Carson Family Professor of Business, Economics Division, CBS; Chair, Economics Division, CBS

Jenny Tromski

VP of Business Development, Impact & Partnerships, BNY

Felipe Verastegui-Grunewald, PhD Candidate, IEOR Department, Columbia University

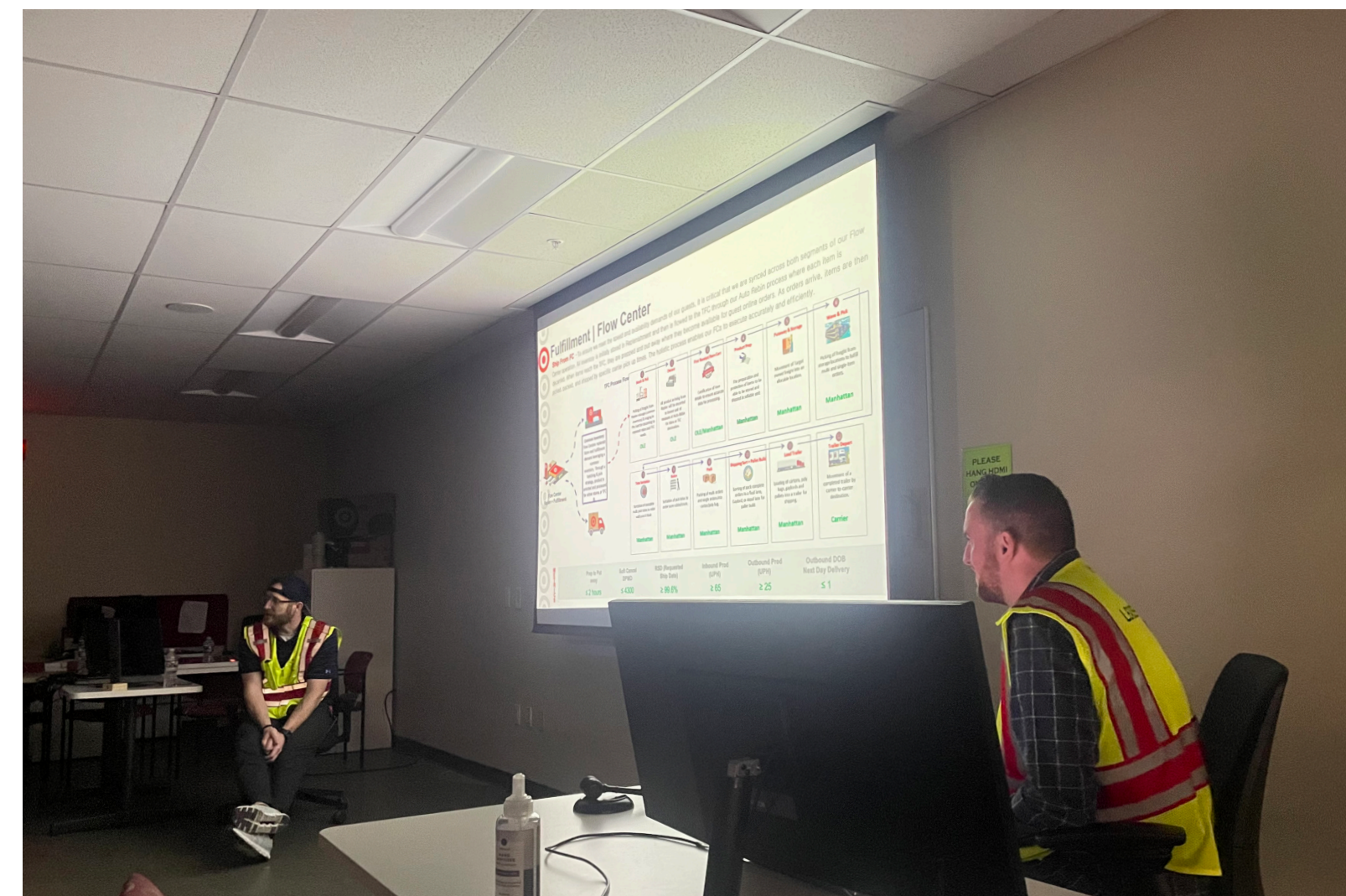
Target

May 19th, 2025

On Monday, May 19th, 2025, the W. Edwards Deming Center at Columbia Business School hosted a group of faculty, students, executives, and staff from across Columbia University on a multi-stop visit to Target's logistics and retail operations sites in the greater Philadelphia area, with the goal of deepening understanding around the company's "stores-as-hubs" strategy, as well as its in-store and last-mile logistics. Founded in 1902 and headquartered in Minneapolis, MN, Target is the 7th largest American retailer and operates a chain of department stores and hypermarkets known for offering stylish yet affordable products. The visit to Target was organized as part of the Center's study tour initiative, which aims to give faculty and students the opportunity to observe effective strategy implementation and operations principles in diverse, real-world contexts, as well as to exchange ideas with business leaders. The visit was graciously organized by the Target team in thanks to Brian Cornell, Chair and CEO of Target, as an honoree of the 2023 Deming Cup for Operational Excellence.



Entrance to Target Flow Center in Logan Township, NJ



Overview from lead operations team on the role of flow centers in Target's "stores-as-hubs" strategy

The day began with a facility tour through one of Target's flow centers in Logan Township, NJ. A key node in the retailer's regional distribution strategy, Target's flow centers serve as upstream hubs

that pre-sort merchandise from suppliers before being routed to retail stores for fulfillment. The facility's leadership team walked the group through the site's operational model, which manages a high volume of general merchandise – particularly apparel, which accounts for roughly 60% of total volume – through various fulfillment strategies, including vendor-prepped shipments and internal sorting processes, sending out 1,500 to 5,000 packages per day. The facility featured 32 prep stations, 90 pickers, and a user-directed, pick-and-place storage network with the capacity to hold nearly 4 million items, all part of a system designed to minimize labor duplication, improve visibility into supplier behavior, and optimize inventory access to support just-in-time store replenishment.



Group photo at Target Flow Center in Logan Township, NJ



Group photo at Target Retail Store in King of Prussia, PA

Next, the group visited a Target retail store in King of Prussia, PA, which doubles as an e-commerce fulfillment center as part of the Target's "stores-as-hubs" model. The tour emphasized how technology, training, and store layout contribute to high-efficiency picking for mobile and online orders, and store leaders detailed how Target has restructured both its front-of-house and backroom spaces to allow faster picking paths, clearer SKU organization, and better inventory flow. Notably, approximately 20 percent of store sales now come from online or app-based fulfillment, and a significant proportion of these orders are fulfilled either by direct customer pickup or same-day delivery services. In addition to a view of the store's backroom inventory, visit attendees observed how employees manage the balance between floor stocking and mobile order fulfillment using real-time replenishment tools and guided pick paths that streamline store operations.

The last stop on the visit was to a Target Sortation Center, also located in King of Prussia. Unlike traditional warehouses, this site functions as a rapid redistribution hub in preparing packages for final-mile delivery. Here, visitors learned about the growing role of third-party logistics (3PL) partners in Target's ecosystem, and key topics of discussion included operational agility and Target's long-term investments in supply chain resilience. Overall, the visit to Target sparked discussion around balancing efficiency with flexibility in a high-volume, omnichannel retail environment, and Target's willingness to share operational insights offered students and faculty an example of innovation in today's retail landscape.



Photos across:

- (1) Presentation on Target's approach to replenishment and inventory management
- (2) Walk-through of Target's backroom inventory space
- (3) Group photo at Target Sortation Center

Martin Guitar

May 20th, 2025

The study tour continued Tuesday, May 20th, 2025, with a visit to the headquarters of C.F. Martin & Co., Inc., also known as Martin Guitar. Founded in 1833, Martin Guitar is one of the oldest guitar manufacturers in the United States, renowned for its craftsmanship and innovative role in developing iconic acoustic guitar designs, such as the dreadnought body shape, now a standard across the industry. The visit offered Columbia faculty, students, and staff a behind-the-scenes factory tour of the guitar-making process, as well as a visit to the museum, showcasing the company's nearly 200-year history alongside a unique manufacturing environment rooted in heritage.



Entrance to Martin Guitar in Nazareth, PA



Fred Everett, Director of Process Improvement, discusses wood specifications and global sourcing strategies

During the factory tour, participants observed the end-to-end production process, carried out across 20+ departments – from raw wood intake to final assembly and stringing. With an SKU portfolio of more than 150 guitar models, the tour showcased the care and complexity that go into crafting each Martin instrument, particularly those in the high-end dreadnought and custom shop series, many of which are customizable across a wide range of specifications, including inlays, finishes, and neck profiles. Factored into the high-end price point, Martin's

global material sourcing strategy prioritizes quality while navigating tight regulations, with exotic and domestic woods such as ebony, mahogany, and rosewood sourced from long-established suppliers across Central and South America, Africa, and the American Pacific Northwest. Also evident during the tour was Martin’s integration of advanced technologies like CNC routing and UV finishing alongside traditional handcraft methods. Similarly, lean manufacturing principles are selectively applied not to eliminate artisanal labor, but to enhance flow, reduce material waste, and improve station ergonomics. Last of the assembly stations, each instrument undergoes rigorous quality control consisting of a final cosmetic inspection in addition to sound testing and tone evaluation.



Custom body inlay of the D-3 Millionth guitar, a limited-edition celebrating the 3-millionth serialized Martin guitar



The group observes the factory’s CNC machine, which precisely carves the body’s inside ribbon inlay

After the factory tour, the group visited the Martin Guitar Museum, home to one of the most extensive collections of vintage and rare Martin instruments. The museum revealed the company’s significant impact on American music and guitar culture more broadly, from its early parlor guitars to iconic models played by artists like Johnny Cash and Eric Clapton.

Concluding the visit, the group had the opportunity of meeting with Thomas Ripsam, President and CEO, as well as a CBS alumnus, who spoke about the company's strategic challenges in a niche yet competitive market, including how Martin balances its artisanal roots with the realities of global competition, digital marketing, and shifting customer expectations. He also addressed the importance of cultural stewardship, ensuring that high-integrity craftsmanship can thrive when supported by efficient processes and a purpose-driven culture. Overall, the visit showcased the balance between time-honored craftsmanship and modern innovation, with every instrument carrying the Martin legacy.



Photos across:

- (1) Assembled guitar bodies with sunburst finishes
- (2) Martin's robotic buffing machine
- (3) Group photo at Martin Guitar Museum

Feedback

“It was fascinating to see the entire supply chain operation of Target in one day, going from a fulfillment center, to the store operation, and finally to the sortation center. I was particularly happy with how knowledgeable the Target employees were on all of our questions and how much they enjoyed showing us their efficient operation.”

- **Adam Elmachtoub**, Associate Professor, IEOR Department, Columbia University

“The Target site visit was a truly inspiring experience that brought to life many of the challenges and innovations at the heart of modern supply chain systems. Seeing how data-driven fulfillment, flow centers, and last-mile logistics come together offered not only practical insight but also sparked new research questions for me around dynamic decision-making and reinforcement learning in large-scale networks. A highlight of the visit was the opportunity to speak directly with Target team members at various levels and gain a glimpse into their day-to-day roles – their enthusiasm and clarity made the experience all the more meaningful. I’m

sincerely thankful to the Deming Center team for their thoughtful planning and support throughout the tour.”

- **Priyank Agrawal**, PhD Candidate, IEOR Department, Columbia University

“This was a unique opportunity to go behind the scenes of one of the most recognizable names in American retail and witness first-hand how innovation, logistics, and customer experience come together on the ground. It was particularly eye-opening to see how Target uses its physical stores as dynamic fulfillment hubs – a hybrid model that blurs the line between brick-and-mortar and e-commerce. The people from Target went above and beyond to make us feel welcome: their openness, generosity, and pride in their work left a lasting impression.”

- **Caroline Jagtenberg**, Visiting Professor, IEOR Department, Columbia University

“Martin Guitars’ business strategy is unique because it operates in a very special market, catering to top guitarists and musical creators across a wide range of countries, musical genres and artforms. It was exciting to see how, in a time when

musical automation and generative AI are booming, the company is instead finding ways of putting technology at the service of craftsmanship – driven by the conviction that the physical act of creating music will remain irreplaceable. I enjoyed seeing how much detail goes into their product components, as well as learning how these details have shaped music throughout the years.”

- **Felipe Verastegui-Grunewald,**
PhD Candidate, IEOR Department,
Columbia University

