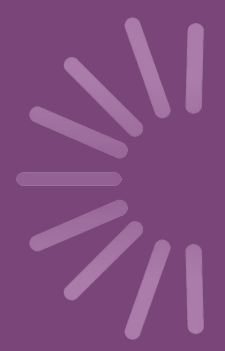


 **Columbia Business School**  
W. Edwards Deming Center  
for Quality, Productivity,  
and Competitiveness



**Supply Chain  
Innovation  
Network**



# SCIN Visit to EY-Nottingham Spirk Innovation Hub

April 27<sup>th</sup>, 2023

# Attendees

## **Saima Ahmad**

Global Director, Strategic Sourcing,  
Supply Chain, Northrop Grumman

## **Jerry Anunrojwong**

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

## **Richard Aviles**

President, Kingbridge Cleaners & Tailors

## **Bret Celmer**

Vice President, Supply Chain, FreshDirect

## **Keely Croxton**

Professor of Logistics, Department of  
Marketing and Logistics, Fisher College of  
Business, Ohio State University

## **Alexandria Darin**

Executive MBA Global '23 Graduate, CBS

## **Jing Dong**

Regina Pitaro Associate Professor of  
Business, DRO Division, CBS

## **Phyllis Dyson**

Vice President, Global Product Supply, Duracell

## **Nelson Fraiman**

Professor of Professional Practice,  
DRO Division, CBS; Faculty Director,  
W. Edwards Deming Center, CBS

## **Anthony Gonzalez**

Vice President, Engineering, Quality, and  
Operations, Hilmar Cheese Company

## **Kreg Koford**

Senior Vice President, Supply Chain and  
Sustaining Care Services, Memorial Sloan  
Kettering Cancer Center

## **Hongyao Ma**

Assistant Professor of Business,  
DRO Division, CBS

## **Stephane Masson**

Senior VP, Global Procurement,  
Marriott International

## **Molly Muench**

Associate Director,  
W. Edwards Deming Center, CBS

## **Rob Namy**

Chief Operating Officer, Weston, Inc.

**Bill Peacock**

Chief of Operations, Cleveland Clinic

**Jimmy Qin**

PhD Candidate, DRO Division, CBS

**Angela Quintero**

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

**Nachum Sicherman**

Carson Family Professor of Business,  
Economics Division, CBS

**Kenneth Stern**

President, Palisades Media Ventures

**Jenny Tromski**

Assistant Vice President, Business  
Development, Brooklyn Navy Yard

**Liad Yamin**

Director of Engineering, 10XBeta



# Hosts and Speakers

## **Paul Barsch**

Assistant Director of Demand  
Generation, Supply Chain, EY

## **Ross Brubaker**

Global Advisory Account Leader,  
Consumer Packaged Goods, EY

## **Tyler Campbell**

Manager, Supply Chain Consulting, EY

## **Scott Dixon**

Digital Manufacturing Leader, North America, EY

## **Brent Duersch**

Managing Director, EY-Nottingham Spirk  
Innovation Hub

## **Sumit Katyal**

Senior Manager, Supply Chain  
Strategy & Transformation, EY

## **John Nottingham**

Co-president and Co-founder,  
EY-Nottingham Spirk Innovation Hub

## **Bob Schug**

Vice President, Digital Services and  
Supply Chain, Mondelez International

## **Glenn Steinberg**

Global Supply Chain and Operations Leader, EY





Panaromic view of the EY-Nottingham Spirk Innovation Hub in Cleveland, OH



CBS faculty, staff, students, and other invited guests outside the EY-Nottingham Spirk Innovation Hub on April 27<sup>th</sup>. **From left to right:** Jenny Tromski, Nelson Fraiman, Nachum Sicherman, Angela Quintero, Alexandria Darin, Hongyao Ma, Richard Aviles, Jerry Anunrojwong, Phyllis Dyson, Jimmy Qin, Jing Dong, and Molly Muench



# Summary



Nottingham Spirk is an open innovation and product development firm established in 1972 by John Nottingham and John Spirk, now run in collaboration with EY. The firm currently has over 70 employees focused on product invention, design and engineering, user research, rapid prototyping, structural packaging, market strategy, branding, interactive design, quality control, and global sourcing. Partnering with companies in the consumer, medical, retail, and business-to-business industries, the EY-Nottingham Spirk Innovation Hub houses the development cycle from focus group facilitation to product design and mechanical engineering.

Hosted in collaboration with CBS, the W. Edwards Deming Center's Supply Chain Innovation Network (SCIN), and EY, the visit to the EY-Nottingham Spirk Innovation Hub on April 27<sup>th</sup>, 2023 brought together senior business leaders with Columbia faculty, staff, and students for a first-hand look behind the hub's success in innovation, commercialization, and digitization within manufacturing and supply chain.

John Nottingham, co-president and co-founder of Nottingham Spirk, kicked the day off with an infectious enthusiasm for innovation within the space of consumer-packaged goods (CPGs). "Can you believe that the industry standard for commercialization is only 5 percent?" asked Nottingham. "Is that number acceptable to you?" While "design thinking" may be a popular trend, Nottingham noted that, oftentimes, it only leads to brainstorming and post-it notes, with the end result being patents and reports that collect dust on a shelf. In contrast, the EY-Nottingham Spirk Innovation Hub boasts an impressive commercialization rate of 95 percent, and Nottingham was keen to share what he referred to as the "secret sauce" behind the firm's success in designing innovative products that meet consumer needs.

First, he noted the hub's rigorous vetting process that approaches ideas holistically and with an eye for commercialization, rejecting any projects that fail to meet their standards. Second, once a decision is made to produce and soft launch a product, the entire team works relentlessly towards its commercial success. Nottingham used the metaphor of an SUV, where the starting point and the point of commercial success represent two patches of solid





Opening slide for the April 27<sup>th</sup> visit to the EY-Nottingham Spirk Innovation Hub



Brent Duersch, Managing Director of the EY-Nottingham Spirk Innovation Hub, opens the day in the conference space of the EY-Nottingham Spirk Innovation Hub



CBS faculty, staff, and students and members of the SCIN listen to the opening presentations



John Nottingham, co-founder and co-president of Nottingham Spirk, speaks to the group on his process behind product design, prototyping, and commercialization



ground, and the space in between represents quicksand. The multi-disciplinary team at the EY-Nottingham Spirk Innovation Hub, involving industrial design, value engineering, supply chain, insights, branding, and more, piles into the SUV together, driving until it reaches its final destination. Cross-functional collaboration, in other words, is essential to the hub's success, and trademarked through Nottingham's own term, "vertical innovation."

Unique to the EY-Nottingham Spirk Innovation Hub as a product development and innovation firm are its in-house prototyping capabilities, allowing for rapid feedback and shorter time-to-market. Attendees were able to visit the hub's three-floor basement and state-of-the-art machinery dedicated solely to prototyping, alongside its most notable finished projects showcased on the ground floor, including the first affordable electric toothbrush, user-friendly multi-functional lawn-care tools, self-stacking milk packaging, and Internet of Things (IoT)-enabled ice cream. The majority of these projects have arisen from the hub's own initiatives, and the firm raises money from investors to develop prototypes before partnering with or selling to consumer-goods conglomerates, such as Procter & Gamble (P&G).

During the rest of the day, the group learned about the different facets of digital transformation within manufacturing and supply chain from both EY leaders and the SCIN members in attendance, with insight into the creation of digital twins for manufacturing, as well as how to plan for supply chain disruptions, mitigate risks, and extend visibility beyond the first tier. Particularly noted was the importance of a solid foundation in driving value versus just investing in technology for the sake of it. In other words, while artificial intelligence sounds impressive, a foundation of consistent and trustworthy data is crucial to effectively implement AI-powered technology. Furthermore, EY raised the issue of non-communication between enterprise resources planning (ERP) systems, a problem its Supply Chain Intelligence Platform (SCIP) aims to solve by breaking down data silos to enable effective supply chain orchestration.

Invited as a featured guest speaker, Bob Schug, Vice President of Digital Services and Supply Chain at Mondelez International, delivered a presentation on Mondelez's journey into digital manufacturing and the digitization of its own operations, looking at the challenges of implementing a digital road map for each of its sites. Schug provided an overview of the

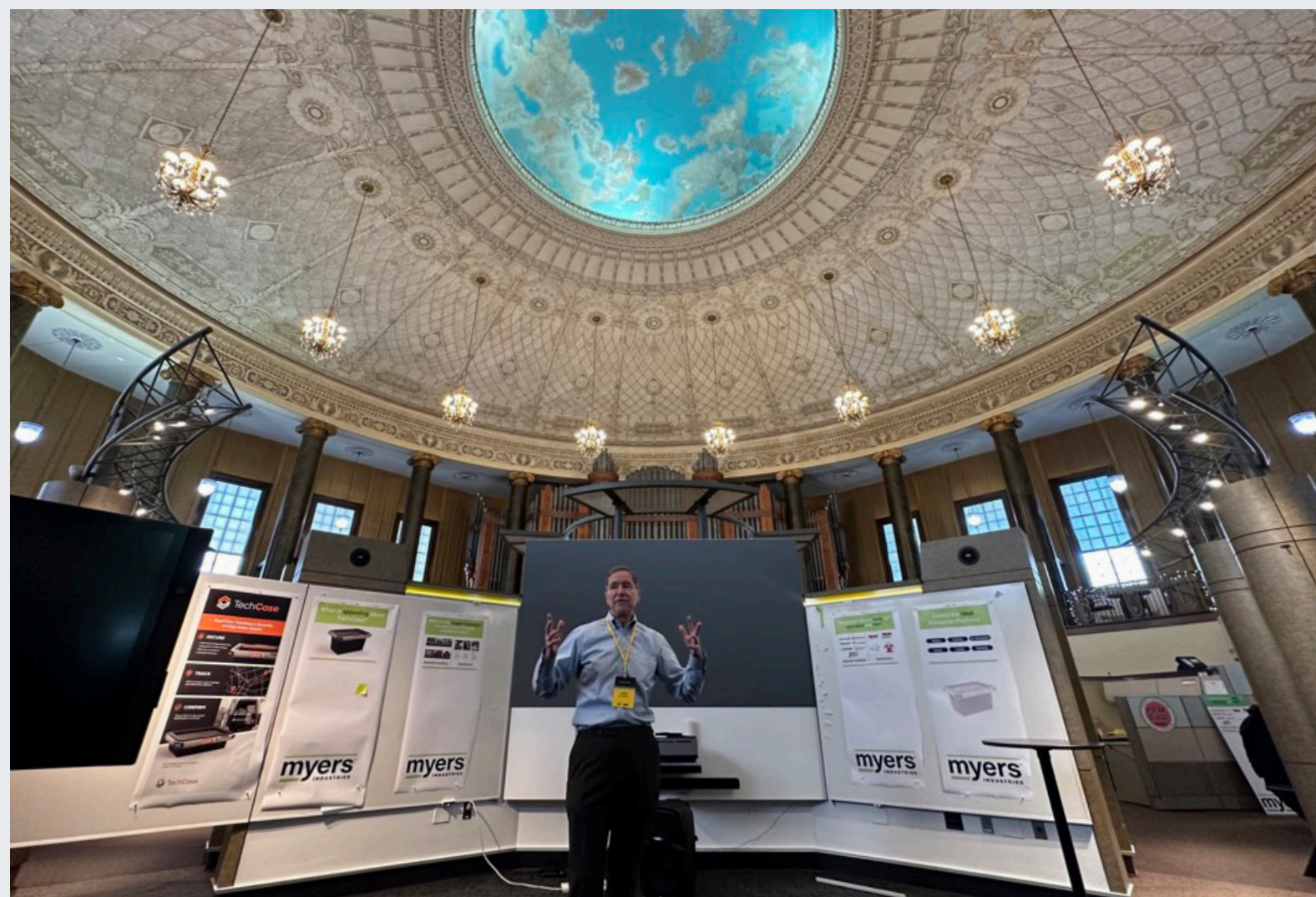




A few of the many patents held by Nottingham Spirk and the EY-Nottingham Spirk Innovation Hub



Notable prototype highlights from Nottingham Spirk, such as Arm & Hammer Spinbrush, the Swiffer Sweep + Vac, and the Sherwin-Williams Twist & Pour paint container



John Nottingham takes the group through the Innovation Hub's spaces, with a visit inside the building's distinctive center dome



Additional prototypes on display in the halls of the EY-Nottingham Spirk Innovation Hub



Mondelez Supply Chain (MSC), comprised of more than 110 manufacturing facilities, 130 warehouses, \$17.5 billion in cost of goods sold, and 55,000 MSC associates worldwide.

While Mondelez has always invested in technology and digitization, Schug noted that a pivotal point in their journey was the 2017 malware incident, which significantly impacted their operations. Since then, the company has undergone a comprehensive transformation of its digital manufacturing infrastructure as a response. Between 2019 and 2021, Mondelez implemented the plant remediation and security program, as well as the foundational line event visibility program. They also developed a plan segmentation strategy program that encompasses four global archetypes: business critical, accelerated visibility and value, developing scalability and value, and emerging priority. These archetypes assist the company in prioritizing growth and execution.

Mondelez has also made significant strides in enhancing its factory cyber posture and augmenting cyber security, recognizing that the factories of tomorrow, equipped with electronic sensors and IoT devices, are particularly vulnerable. Additionally, they have made progress in integrating the lean six sigma program and established the Supply Chain Central Analytics Team. From 2022 onwards, Mondelez has also been actively developing proofs of concept for Azure Internet of Things and Metaverse immersive training, as well as exploring computer vision, artificial intelligence, and machine learning.

According to Schug, the key for the future is to adopt an agile mindset, rather than thinking transactionally. All teams, including manufacturing, engineering, IT, and external partners, need to operate as a unified multi-functional ecosystem in order to unlock exponential value. While manufacturing differs from software development – where the “agile” concept originated – the high-level principles still apply. A key takeaway from the group discussion following was that, at the end of the day, digitization is about the operators, and “buy-in” from plant managers is crucial for project success – if they don’t see the value, the project is likely to fail.

The final presentation of the day was delivered by Scott Dixon, EY’s Digital Manufacturing Leader for North America, who highlighted three major trends impacting the manufacturing industry: globalization, demographics, and digital technologies. He specifically emphasized





Scott Dixon, Digital Manufacturing Leader for EY Americas, explains the concept of a “digital twin” and its use in manufacturing



Bob Schug presents Mondelez' journey into digital manufacturing, emphasizing the importance of having a people-centered approach to digitization



Professor Nelson Fraiman takes a look at one of the hub's robot as it tests for quality assurance for an IoT product currently in development



Bob Schug in conversation with Professor Nachum Sicherman



the role of demographics and the challenges posed by an aging population. According to the National Association of Manufacturers (NAM)'s outlook survey, the primary business challenge in manufacturing has been the workforce, although other factors, such as raw materials, were comparable from 2020 to mid-2022. According to Dixon, the industry as a whole needs to improve its efforts in introducing manufacturing careers to younger generations and adapt its culture and working conditions to attract and retain talent. Another significant trend presented by Dixon is "Industry 4.0," which refers to digital manufacturing and the journey towards digital transformation, which he noted is complex and often slow. At each step, key questions arise: (i) how do we initiate the process, (ii) how do we scale it, and (iii) how do we accelerate it? Ultimately, data-driven manufacturing necessitates commitment across all levels and requires effective integration of people, data, processes, and technology.

# Feedback

“As a participant in this study tour, I gained valuable insights that will undoubtedly contribute to my research and teaching endeavors.”

**Jimmy Qin**, PhD Candidate, DRO  
Division, CBS

“What a great visit to EY Nottingham Spirk! It’s an amazing place and the whole day was fascinating and engaging. Also really enjoyed Bob Schug’s presentation.”

**Kenneth Stern**, President, Palisades  
Media Ventures

“I enjoyed the whole visit tremendously.”

**Nachum Sicherman**, Carson Family  
Professor of Business, Economics  
Division, CBS



