Application: 2027 NBER Digital Economics and AI Tutorial

Yanlei He

Ph.D. Student in Quantitative Marketing, Cornell University

Contact Information

Email yh2358@cornell.edu
Phone +1 607-327-2994
Website www.yanleihe.com
Address Cornell SC Johnson College of Business, Breazzano Family Center #5, Ithaca, NY 14850

Graduate Study

Cornell University, SC Johnson Graduate School of Management 2025–present
Ph.D. in Management, Quantitative Marketing.
Advisor: Jura Liaukonytė.

National University of Singapore, NUS Business School 2023–2025
Pre-Doctoral Research Fellow (full time), Quantitative Marketing.

Peking University, Guanghua School of Management
Master of Economics, National Economics 2021–2023
Bachelor of Economics, Finance 2017–2021

Coursework. I have completed the first-year Ph.D. coursework at Cornell and a two-year graduate program in economics at Peking University.

- *Economic theory*: Microeconomic Theory; Game Theory (Cornell). Advanced Microeconomics; Advanced Macroeconomics (Peking).
- *Econometrics*: Econometrics; Empirical Strategies for Policy Analysis (Cornell). Advanced Econometrics I–II; Applied Microeconometrics (Peking).
- *Industrial organization*: Industrial Organization and Structural Methods (Cornell). Industrial Economics; Structural Estimation in Applied Microeconomics (Peking).
- *Machine learning and AI*: Machine Learning; Natural Language Processing; Deep Learning (Cornell).

Research Interests

My research studies how AI changes what firms and researchers can learn about consumers and products, and what these changes mean for demand, firm strategy, and consumer welfare. Firms can now link data on the same consumer across apps, stores, and devices, and use AI to predict what that consumer will buy. Researchers can use language models to measure complex behavior and product features that standard variables miss. I study both sides of this change with large-scale digital data and the tools of causal inference and structural models.

The value of context in consumer data. A single firm usually observes only the purchases made at its own stores or on its own platform. I ask how much of a firm's demand is driven by activities the firm does not observe, such as where its customers work and which other stores they visit on the same trip. The answer indicates how much a firm would gain from linked consumer data, which large platforms and AI assistants increasingly hold. Privacy regulation must weigh this gain against the cost to consumers.

AI as a measurement tool for economics. Language models can convert unstructured information, such as a consumer's sequence of daily activities or a product's text description, into vectors of numbers. These vectors can capture differences that standard variables miss, such as how a consumer combines activities within a day, or how two products with similar listed attributes differ in function. But their dimensions have no direct economic meaning, and a result may reflect how the input was written rather than how consumers behave. I study how to test what these vectors capture before they are used in demand and policy analysis.

Demand for new and complementary products. Generative AI lowers the cost of creating digital products such as apps, games, and media content. More new products may therefore enter these markets, many of them with no sales history. I study how language-model representations of product descriptions can help predict demand for products that have not yet been sold. Better predictions would help firms decide which products to launch. They would also give more accurate estimates of the consumer gains from product variety.

Current Research Projects

Consumer Choices in the Context of the Day

With Jura Liaukonytė (Cornell University) and Sriniketh Vijayaraghavan (Texas A&M University).

Many purchases are part of a daily routine. Whether a consumer stops at a coffee shop or a grocery store depends on where the trip starts, where it ends, and what else the consumer does that day. Yet firms make targeting, pricing, and location decisions mainly with data on their own transactions. We use mobile-location data that record billions of store visits by millions of devices in the U.S. to study how the rest of a consumer's day affects which stores the consumer visits.

For firms, we ask how much of a store's traffic comes from trips built around other activities, such as commuting or shopping elsewhere. We also ask which stores act as complements or substitutes when they are visited on the same trip. The answers would show how much demand a firm cannot explain with its own records. This gap is one measure of the value of linked consumer data. For policy, we ask how consumers change their daily routines when travel becomes more costly. We study this question preliminarily using New York City's congestion charge, introduced in January 2025. The answer shows whether a transport policy affects retail demand by reshaping daily routines, even though the aggregated demand and traffic remain unchanged.

AI-Based Demand Estimation for New and Complementary Products

Data collection completed; analysis in progress.

In digital markets such as video games, apps, and online content, products are often used together and new ones arrive frequently. Demand also responds to public information about product performance, such as rankings, reviews, and competition results. Standard demand models describe each product by a few fixed characteristics. They have difficulty capturing complementarity among many products, and they cannot easily predict demand for a product with no sales history. Yet firms rely on demand estimates when they decide which products to launch, how to price them, and how to bundle them. This project asks whether AI representations built from product descriptions can improve demand prediction in such markets, especially for new products.

The setting is the *Yu-Gi-Oh!* trading card game, which exists both as physical cards and as an official free-to-play digital version. Its tournament results and card prices are published online. New card sets are released every few months, and each set adds cards designed to work with existing ones. I have assembled data on published tournament decks, match outcomes, daily card prices, card texts, and rule changes such as ban lists. These data show which cards are combined in decks, how those decks perform, and how card prices move over time. The lessons should apply to other digital markets with many complementary products and frequent product entry.

Dissertation

As a second-year student, I have not yet formed a dissertation committee. My dissertation will develop the agenda above. It will focus on how AI changes what firms know about consumers and products, from the value of linked consumer data to demand for new digital products.