IEOR E4575 Designing Digital Operating Models

Who is this course designed for?

This course is designed for graduate students aiming to better understand how digital businesses are applying scientific and engineering thinking to build digital operating models and analytical systems to more effectively compete in the digital economy.

The digital economy encompasses a wide array of industries and household names, ranging from the giants of Silicon Valley, such as Google, and Facebook through to Amazon and Apple, all the way through to firms that run digital media marketplaces and those that invest in digital media and infrastructure.

The students that attend the course will have an interest in the inner workings of Silicon Valley, start-ups, and the digital media business. Others might attend if they want to better navigate the digital world and believe they might have a future need to create data-driven digital strategies and new operating models.

Course Description:

There will be a focus on the fast evolving sectors of ecommerce, advertising technology, and marketing technology, as venture capitalists chase returns in the ever increasing automation of the marketing, sales, and advertising functions.

Marketing and sales were once the broken link in the chain of automation and software that stretched from the sourcing, and manufacturing of goods to robotic production lines, to distribution and supply chains driven by technology. There is now a frenetic amount of innovation happening in this space.

We’ll look widely across the industry to better understand its dynamics, but we’ll also dig deeper to look at the algorithms, patents, and business models at the core of the most successful players in the business. We’ll explore and define the different types of data in the industry and how they are used, as well as look at how they can be used to craft strategy and formulate measurement plans and systems.

While some techniques in data analysis and statistics will be addressed, this is a non-technical course with a primary focus on the business side of the digital ecosystem and the digital economy.
Schedule of parts

Part I – Introduction to the Digital Economy

Part II – Next Gen Competition and Operating Models

Part III – Evolving Uses of Data and Metadata

Part IV – Digital Strategy Optimization

Part V – Digital Measurement and Analytics

Part I – Introduction to the Digital Economy

An overview of the history, size, components and players in the digital economy

Part II – Next Gen Competition and New Operating Models

We will review the main players and analyze the secrets of their success, plus assess their core algorithms and business models, as well as look at emerging business models like Uber. We’ll look at how they apply operational research type thinking to business and operational challenges.

We’ll include specific sessions on Google and its search algorithms, Facebook and its advertising targeting algorithms, as well as look at the new automated advertising markets and how these markets work. We’ll review key patents they have developed and look at how they have built operating models around them.

Part III – Evolving Uses of Data and Metadata

Data is the oil of the digital economy. We look at the types of data, the market for data and how they are used in business strategy. We’ll also assess how key firms use data to compete.

We’ll look at:

- Website data and what it tells us
- Social data and social listening
- Metadata and how it’s used
- Panel data, third party data, cookies, and data markets
- Geo data
- Privacy and its impact on the future of data
- Tagging and trafficking strategies
- Data Management Platforms (DMPs)
**Part IV – Digital Strategy Optimization**

We will look at how brands are crafting strategy and optimizing strategy for the digital economy. We will assess the variety of digital strategies and compare them to understand which are the most effective. In this module you’ll also learn the fundamentals of how to develop a digital strategy and methods for optimizing that digital strategy.

- Collecting data
- Mapping a market
- Identifying whitespaces
- Crafting a strategy
- Producing a plan
- Optimizing the strategy

**Part V – Digital Measurement and Analytics**

We will map the different types of measurement and analytics that businesses can use in digital and complete a tutorial on how to create a measurement strategy and framework.

We’ll look at:

- Measurement and analytic frameworks for businesses and brands
- The Marketing Funnel and the McKinsey Loyalty Loop
- Techniques and data sources for measuring business strategies and KPIs
- Brand Analytics such as awareness analytics, engagement analytics, and conversion analytics
- Creating a dashboard, as well as managing and operating a dashboard

**Approximate Weekly Schedule**

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<th>Week</th>
<th>Part</th>
<th>Topic</th>
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<td>Part I: Introduction to the Digital Economy</td>
<td>The state of the digital economy today</td>
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<td>2</td>
<td>Part II: Next Gen Competition and New Operating Models</td>
<td>Key players in the digital economy</td>
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<td>3</td>
<td>Part II: Next Gen Competition and New Operating Models</td>
<td>Overview of main digital business models</td>
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<td>4</td>
<td>Part II: Next Gen Competition and New Operating Models</td>
<td>Google’s ecosystem, algorithms and business model</td>
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<td>5</td>
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<td>Facebook’s ecosystem, algorithms and business model</td>
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<td>Demand Side Platforms and Supply Side Platforms</td>
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<td>Next generation business models</td>
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<td>8</td>
<td>Part III: Evolving Uses of Data and Metadata</td>
<td>Types of digital data</td>
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<td>Part III: Evolving Uses of Data and Metadata</td>
<td>Metadata and digital strategy</td>
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<td>Part III: Evolving Uses of Data and Metadata</td>
<td>Data providers and programmatic marketplaces</td>
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<td>Digital Strategy Optimization</td>
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<td>Components of a digital strategy</td>
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<td>Producing a digital strategy and optimizing that strategy</td>
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<td>Part V: Digital Measurement and Analytics</td>
<td>Creating a measurement framework and plan</td>
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<td>15</td>
<td>Part V: Digital Measurement and Analytics</td>
<td>Key challenges in digital measurement and analytics</td>
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</tbody>
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Required Text


2. Connected by Design: Seven Principles for Business Transformation Through Functional Integration – May 19, 2014 by Barry Wacksman and Chris Stutzman
   http://www.amazon.com/Connected-Design-Principles-Transformation-Integration/dp/1118858204/ref=sr_1_1?s=books&ie=UTF8&qid=1444053232&sr=1-1&keywords=Connected+by+Design

3. The Anatomy of a Large-Scale Hypertextual Web Search Engine by Sergey Brin and Lawrence Page

4. Advertisements with multiple targeting criteria bids by Rong Yan, Huajing Li
   https://www.google.com/patents/US8768774

5. Methods and systems for impression inventory trading by Eric Anderson, Catherine S. O'Kelley, and Wendy W. Johansson
   https://www.google.com/patents/US20140358798?dq=inassignee:%22AppNexus+Inc.%22&hl=en&s渠a=X&ved=0CDAQ6AEwAzgKahUKEwijH2KfXvKvIaD4KHBtJCMcE

Deliverables:

• Homework assignments (individual):
  – homework assigned every few weeks except during exams and project presentations.

• Project presentations and reports (completed in groups of three of four):
  – three projects.
    ▪ eCommerce Optimization Algorithm Design
    ▪ Digital Strategy
    ▪ Digital Measurement Framework and Plan

Grades:

• Homework: 30%
• Projects: 60% (20% per project)
• Class participation: 10%

Guest Speakers:

We plan to host a range of speakers from across the digital economy.