

LQ²: Leadership: Quantitative and Qualitative Approaches

January 10-11, 2025

Dimitris Bertsimas and Mostafa Terrab

Discussants: John Hanlon, CEO of AlphaRoute and former COO of Boston Public Schools and Barry Stein, MIT EMBA, Chief Clinical Innovation Officer of Hartford HealthCare.

Syllabus

Philosophy: Quantitative approaches are becoming increasingly important in organizations, as they are driving disruptions in the way business is carried on. The class will show how quantitative models can be important tools for leaders to implement changes in the culture and the political game within organizations through real world experiences. Participants will have the opportunity to reflect directly on business cases described below in interaction with lecturers who led and implemented deep transformations involving quantitative approaches. The class will also focus on the complementarity of these quantitative approaches with traditionally, and necessary, qualitative ones.

Goals: The class aims to show students using real world examples from the two instructor's experience, how organizations changed using analytics but also taking into account the human/cultural components. The class uses interdisciplinary approaches, and it is an elective that can satisfy the analytics certificate requirements.

Instructors:

Dimitris Bertsimas, Boeing Professor of Operations Research and Associate Dean of Business analytics, E62-560; Tel.: (617) 253-4223; e-mail: dbertsim@mit.edu, <https://dbertsim.mit.edu/>

Dr. Mostafa Terrab, PhD from MIT, Chairman and CEO of OCP Group, email: m.terrab@ocpgroup.org

Professor Bertsimas will discuss his experience with Boston Public Schools, his founding of the company Dynamic Ideas routing that applies the lessons of LQ2 to many other School districts, his work on holistic hospital optimization with Hartford Hospital and his work on Covid-19 with Johnson and Johnson and the CDC.

Dr. Mostafa Terrab will take participants through the transformation of OCP (largest company in Morocco) from a volume-oriented bureaucracy under administrative oversight to a highly profitable leader reshaping the whole fertilizer sector and through how quantitative approaches were central in this endeavor.

Teaching Assistant:

Lisa Everest, leverest@mit.edu

Outline of Lectures:

January 10, Day 1

8:30am-11:30am: OCP 1

In this session, we introduce the cultural and operational challenges OCP was facing before 2006 and highlight the imperative for change. We then expose models associated with leadership and change management and show how they apply to OCP to identify, abstract out and transform the mental models that dictate how a company and people operate.

1-4pm: OCP 2

In this session, we introduce an analytics toolbox and show the role of quantitative models not only in making complex, dynamic and integrated decisions, but more importantly in driving mindset changes and creating a collective intelligence materializing in fact-based discussions. By studying various models, we show how LQ² became a way to lead at OCP emphasizing that models not only reveal mental representations but subjectively suggest new ones.

January 11, Day 2

8:30am-11:30am: Boston Public Schools

In this session, we discuss Prof. Bertsimas' experience with Boston Public Schools in which an MIT team he led designed and implemented an algorithm for routing buses for BPS that led to significant savings. He will further discuss the proposed algorithm for changing start times in schools, which the BPS school committee voted to adopt, but eventually was not adopted. Professor Bertsimas will also introduce AlphaRoute, a company that designs bus routes and selects start times for districts around the world. John Hanlon, former Chief operating officer of Boston Public schools at the time and CEO of AlphaRoute will participate in the discussion.

1-4pm : Holistic Hospital Optimization in Hartford Hospital and the DELPHI model for Covid-19 infections and hospitalizations used by CDC and by for Johnson and Johnson

In this session, we introduce how quantitative models and in particular LQ² is affecting the development and implementation of machine learning and optimization methods to improving the delivery and cost of health care in the Hartford Health care system. Dr. Barry Stein, Chief Clinical Innovation Officer of Hartford HealthCare and MIT EMBA Alumn, will participate in the discussion.

We will also present the work of Professor Bertsimas's group for creating the DELPHI model that predicts infections and deaths for Covid-19 patients and is one of the models used by CDC and it has been used by Johnson and Johnson to decide where to conduct clinical trials for the Covid-19 vaccine.

Grading: Students are required to submit a proposal of how LQ² applies to their organizations by January 23, 2025. The length of this proposal should be at most 4 pages.