SCM.294. Digital Supply Chain Transformation
2020 - 2021

Details

Meets: TBD
Classroom: Hybrid (online&in-person)
Units: 2-0-4
Graded: TBD
Canvas: TBD
Office Hours: TBD

Instructor:
Dr. Maria Jesus Saenz (mjsaenz@mit.edu)
Director, MIT Digital Supply Chain Transformation

Co-instructor: Dr. Ozden Tozanli (otozanli@mit.edu)

Prerequisites: Graduate-level courses in operations management, logistics design and/or supply chain management preferred.

Justification for the creation of this course

Digitalization is revolutionizing many industries, one field of exceptional transformation is the supply chain. Across the globe, industries have changed rapidly due to multiple factors: customer-centric strategies, supply chain expectations on delivery and customization, and many others. Final consumers learn and engage with brands and their partners. Managing suppliers upstream is also changing quickly. Supply chain actors’ expectations are increasing, their experience is becoming more prevalent, and they continue to open doors for new digital offerings.

This course allows the students to learn in creating digital supply chain strategies and in experimenting with the key digital supply chain capabilities, for further implementation and transformation in their dynamic value chains at work. This course will contribute to the portfolio of electives at MIT, adding the perspective of the supply chain and their actors, as well as integrating the different areas of operations together with the technological transformative approach.

Course Description

Analyzes the factors involved in the digital transformation of supply chain relationships. Develops an in-depth understanding of the perspectives, roles, and decisions of relevant stakeholders in transforming supply chains in the digital era. Covers digital supply chain capabilities (Visibility, Agility, Collaboration, Omnichannel), the role of technology (Blockchain, IoT, AI, Digital Twins), processes and organizations, as well as digital platforms and performance. Discusses relevant and novel case studies.
of digitally transformed supply chains, covering topics of long-term competitive advantage, through operations and digitally enhanced value generation. Includes presentations, guest executive speakers, simulations, team projects, and case discussions under experiential learning complementary approaches.

Objectives

The four primary objectives of this course are:

1. Develop experience in creating a digital supply chain strategy
2. Identify and learn how to implement the key digital supply chain capabilities
3. Practice with End-to-End data governance and supply chain performance
4. Understand the balance between technology, processes, and organizations
5. Learn from simulations and case studies that successful implemented digital transformation, as well as from the challenges they faced.

Course Environment

Class sessions will be divided in three sections each week: one lecture online and the overall class group will be divided in smaller groups that will meet on-line or in-person, depending on the topics to be discussed and the profile of the students attending the classes each week. All the sessions will be synchronous.

For this course, the interaction and experiential learning becomes key, so class sessions will cover real-time presentations, case studies, simulation, group discussions, and quizzes. Students will participate just as if they were in an in-person course, based on:

- **One week in advance** to each class, the expectations about that class will be posted in Canvas. This will include: learning objectives, instructor/speaker, reading documents (required and recommended) and homework.
- **Before each session** students are required to deliver a preliminary homework/report regarding the case/topic that will be discussed that day. For that purpose, some questions and instructions will be posted in advance for each class.
- **During each session**, discussions and breakout rooms might be hold associated with the relevant case study and deliberate in the class interactively. Please make sure that you appoint one representative of the group who will inform about the names of the participants of that discussions. Quizzes will be conducted to assess the students’ knowledge of the key concepts. Attendance will be monitored.
- **Attendance to the final project presentations** is required and discussions in the last session of the course. This is required to organize interactive learning and discussion environment with presentations and Q&A of all participants.

Some **practical instructions** for the online learning mode, just for enriching your interactive learning through this course:

- Please be especially well-prepared for the class discussions.
- You have to follow the class and participate with your video ON. This is important both for class dynamics and your engagement.
- During our classes please do not check emails, surf the web, connect to social media etc.
• The mics must be muted by default. If you want to participate during the class raise your hand within the Zoom system, so I can call on you and only then you will unmute your mic.
• If you have technical problems, please contact Dr. Ozden Tozanli and copy me.
• We really welcome any feedback or suggestions to improve your learning experience within this course.

Grading

This course is graded through four primary components:

• **Graded Assignments** (30%): Primarily individual exercises but also team-based, with one assigned for each class. Performed during or/and outside of class time. Instructions for each assignment will be provided with at least one week in advance the class. Each assignment will be delivered via Canvas by the indicated deadlines.

• **Quizzes** (20%): For some lecture topics, students will answer quick quizzes with the main goal of assessing the key concepts of the class.

• **Class Participation** (15%): Students are expected to actively contribute to class discussions. Most class sessions will be based on cases, and all of them will require discussion, that will be graded accordingly to the value-added by the student to the learning progress of the class. Substantive contributions will be thoughtful, well-articulated and will make the collective advance of class’s discussion.

• **Final Project** (35%): The course project will require students by teams to apply and integrate the different concepts and practices learned in class along the course. See the Final Project description below.

Academic Honesty

As an MIT student, you are expected to adhere to [MIT academic integrity policies](https://web.mit.edu/honr/honr13.html). Specifically, all work for a grade that you submit must be your own work and only your own work, both individual- and group-based.
(Tentative) Course Schedule

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<td>Industry 4.0 and Digital Transformation</td>
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Topics

**Week 1. What do we mean by Digital Supply Chain Transformation?**

**Session 1a. Overview of the Course. Introduction to concepts.**
Instructor: Dr. Maria Jesus Saenz

**Session 1b. Digitizing vs Digitalizing in Supply Chains.**
Instructor: Dr. Maria Jesus Saenz

Readings for this session:

**Week 2. Digital SC Transformation Capabilities**

**Session 2a. eCommerce Transformation and Omnichannel Revolution.**
Adidas Russia Case Study.
Guest Speaker: Dr. Eva Ponce. Executive Director MITx MicroMasters in SCM. Director, Omnichannel Distribution Strategies. MIT CTL

Readings for this session (*only recommended):*
- Adidas Russia / CIS and the Russian crisis: retrench or double down – Case Study.

Assignment:
- Case study report individually before the session: answer Bell et al.’s pre-reading questions before the session
- D1. Project Scope (1 page) Select the final project topic, scope, business case and team partners. See the Final Project description below.

**Session 2b. Visibility, Visualization and Data Governance.**
Guest Speaker: TBD

Harmonization, Visualization and Data Governance:
- Company’s experiences with the development, implementation, processes mapping and scalability: framework, pillars (Real/Right Time, Collaboration, Mobility), etc.
- Data and technology: How Company’s tools, like platforms, ERP, sensors in manufacturing and logistics, Machine Learning and other technology, are complemented each other for the SC.
Required readings for this session (*only recommended):

- Flex. *How we use real-time data analytics to manage complex supply chains*, 2018.

**Week 3. The Role of Technology and Digital Platforms**

**Session 3a. Achieving End-to-End Connectivity: Blockchain applications to Supply Chains.**
Guest Speaker: Dr. Inma Borrella. Research Scientist, MIT CTL.

Required readings for this session:

- Hunsaker B.T., IBM: Building with Blockchain Case Study, 2017 (TB0535-PDF-ENG)

Assignment:
- Short report with arguments to be used in the role-play game about the applications of Blockchain in Supply Chains. Instructions will be delivered in advance.
- D2. Project Deliverable about Digital SC Transformation Capabilities. See the Final Project description below.

Instructors: Dr. Maria Jesus Saenz and Dr. Ozden Tozanli

In these two sessions (3b and 4b) we will work around the principles of vertical and horizontal collaboration and the opportunities that working with different competitive and non-competitive partners could bring into digital supply chains. Students, working in teams, will apply these insights into a simulation addressed to create a digital platform for last-mile delivery. Discussions about incentives, gain sharing and performance will take place.

Readings for this week (*only recommended):

- Saenz, M.J. The Physical Internet: Logistics Reimagined?. Supply Chain Management Review. 23 March 2016.*

**Week 4. The Role of Technology and Digital Platforms**

**Session 4a. Industry 4.0 and Digital Transformation**
TetraPak Case study. A digitally enabled supply chain as a competitive advantage. The role of technology (IDM960)
Instructor: Dr. Maria Jesus Saenz

Required readings for this session:

Assignment: Case study report individually before the session.

Instructors: Dr. Maria Jesus Saenz and Dr. Ozden Tozanli

Assignment: Report with the simulation results, according to instructions provided for the simulation.

**Week 5. Digital SC Transformation Roadmap**

**Session 5a. Digital SC Transformation Vision. What supply chain capabilities can help better respond to the ever-changing customer requirements**
The vision of Dell’s Digital Supply Chain Transformation
Guest Speaker: TBD

Required readings for this session (*only recommended):
• Case Study Dell’s Digital Supply Chain Transformation, Pat I - Vision, Forthcoming 2020.

Assignment:
- Case study reports individually before the session.
- D3 Project Deliverable about The role of technology and digital platforms. See the Final Project description below.

**Session 5b. Digital SC Transformation Roadmap. Operational and Organizational Challenges**
Roadmap of Dell’s Digital Supply Chain Transformation
Guest Speaker: TBD

Required readings for this session (*only recommended):
• Case Study Dell’s Digital Supply Chain Transformation, Part II - Roadmap, Forthcoming 2020.
• Saenz, M.J. and Cottrill K., Navigating the road to digital supply chain transformation. Supply Chain Management Review, Jan 2019.*

Assignment: Case study reports individually before the session.

**Week 6. Advanced Applications**

**Session 6a. Artificial Intelligence-Driven SCs: Challenges and Opportunities**
Instructor: Dr. Maria Jesus Saenz

Required readings for this session (*only recommended):
• Forger G. AI Starts to make some supply chain decisions, Supply Chain Management Review, March 2020.

Session 6b. Final Project presentations by the teams of students.
Wrap Up and Final Discussions.
Instructor: Dr. Maria Jesus Saenz

Assignment: D4 Final Project report and presentation by teams. See the Final Project description below.

Final Projects

The main goal of these projects is to apply the main concepts and practices learned along this course, together with previous experience of the students, as well as additional insights extracted from current research.

The final projects will be done in teams of 4 (exceptionally 3) students. You will make the teams but please consider the compatibility of your schedules and time zones.

Each team will work on the analysis of the digital supply chain concepts worked in the course, applied to a particular industry/sector/area. The analysis might include the following (but not limited to): the description of the company/s and its supply chains, current and future (digital) business model, challenges, opportunities, potential digital transformation developments, and the future (5-10 years) you envision for this industry, as well as the topics covered along the course. You can base your analysis in one particular company within a particular industry, known or not known by you; you can develop a benchmark of the industry/sector, or you can select one portion of a supply chain of the industry that is relevant for proposing new insights around digital transformation. You can also propose a pilot study.

Each team must notify the names of team members, expected scope and business case for their project by the first session of Week 2 (D1). By the following week/s after each topic is addressed in class, each group will deliver a short essay of that topic applied to their project, according to the deadlines announced above in the schedule. Therefore these are the expected project deliverables (2 pages each):
D1. Project scope, team members and business case
D2. Digital SC Transformation capabilities
D3. The role of technology and digital platforms
D4. Final report and presentation (including Digital SC Transformation roadmap)

Each group will deliver a 10-15-page critical analysis paper (based on the previous deliverables) as well as a short PowerPoint presentation to the class in the last session, including a discussion section with the rest of the class. This session is mandatory for all the class. All projects will be made public for the class to share.