



**OIDD-680**

**Operations Strategy Practicum**

**Semester in San Francisco**

(Revised September 15, 2016)

**Location:** Wharton West Campus and various company sites in the US and Mexico

**Dates:** Fall Semester 2016

- Lectures, Case Discussions
- Visits to US and Mexican manufacturing plants and service provider facilities
- Presentations by senior managers

**Credit:** 1.0 Credit Unit

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## **Course Overview and Learning Goals**

This course will focus on the management of operations at manufacturing and service facilities located within the US and Mexico, that are used either by domestic corporations or by foreign multinational companies that operate in the US. Our emphasis will be on the evolving patterns of operations strategies adopted by firms for sourcing manufacturing, distributing products, delivering services and managing product design as well as on programs for enhancing quality, productivity and flexibility. We will focus on the formulation and execution of such strategies for a collection of firms in the context of the current dynamics of global competition. The course will consist of a set of site visits and in-class sessions which include lectures, case discussions and management speakers who will describe their company's current strategy.

Our course is motivated by the fact that many manufacturing and service producing firms are re-examining the structure of their global supply chains, internal processes and sourcing strategy in response to the uncertainties and risks they face in these turbulent times. These adjustments are occurring against a backdrop of fundamental change to the environment in which companies operate. For decades a dominant strategy in manufacturing has been to outsource to low cost global suppliers. This has led to the transfer of millions of manufacturing jobs and development activities out of the US, Japan and Europe and into low labor cost countries such as China, India and Vietnam. Today this trend is being challenged by a movement by some companies to "re-shore" their manufacturing by bringing it back or at least moving it closer to their developed country market, i.e. by "near-shoring" to locations such as Mexico or Eastern Europe. At the same time many firms continue to select offshore locations for outsourcing of material inputs and services. Similar arguments for global sourcing and re-shoring can also be made for firms that act as suppliers of services such as Business Process Outsourcing, Customer Service Support, Product Design and Software Development. Moreover, there have been major technology developments affecting production automation and product design which are contributing to this re-structuring.

This course will consider the current status of operations strategy and process management primarily from the perspective of major multi-national firms, although we will also interact with startup companies. The goal is to provide the class with the opportunity to interact with senior executives from these companies, which are headquartered and/or operating in the US and Mexico, to explore current thinking and state-of-the-art practices concerning their global operations. Learning will be facilitated by providing students with the opportunity to observe company operations in action under the guidance of company management. These interactions will facilitate an exchange of ideas that will identify managerial challenges and concerns. It will also ascertain current practices and intentions of participating companies. Moreover, the course will consider various models and frameworks that have been developed in the economics, public policy, operations and management literatures for dealing with strategies for global supply chain sourcing, technology management and process improvement. We will, in particular, review the underlying principles of some of the key operations strategies that are widely adopted in industry. We will also consider how technology developments are impacting current operations strategy (e.g. automation, E-commerce, Internet of Things). Finally, we

will explore how supply chains and operations processes are being designed and managed by startup companies. Our objective is to develop an understanding of the drivers of operations strategy decisions, at present and in the future, in order to identify opportunities for improvement and barriers to implementation.

We will explore these issues through the lens of visits to a specific group of multinational and emerging companies located on the west coast. The companies will be chosen to cover a range of manufacturing and service industries where global sourcing, productivity and coordination are key issues e.g. aerospace and defense, automotive, consumer electronics and computers, consumer products, entertainment, health care, logistics, e-commerce and semiconductor. This course will build off of the learning based on a Global Modular Course on this topic that has been offered in Japan over the past three years and from prior versions of the course that have been offered to students participating in the Wharton SiSF (Semester in San Francisco) program with a focus on the west coast and to regular MBA students with a focus on Germany and east coast firms.

### **Course Organization and Requirements**

The course will include sessions at the Wharton West facility that include lectures, corporate manager visits and case discussions as well as a number of road trips to various company sites that are accessible from the Bay area or are within several hours travel time (i.e. Seattle and San Diego / Tijuana). Students will be responsible for expenses for those visits requiring travel away from the Bay area. The estimate for these expenses are \$1,910 (single occupancy) and \$1,220 (double occupancy) for the course, not including airfare from San Francisco to Seattle and to San Diego. The expense fee will cover hotels, land travel and some meals.

### **Pre-requisites**

Students taking this course should have completed either the core course, OID 611, "Managing the Productive Core of the Firm: Quality and Productivity", or OID 615, "Managing the Productive Core of the Firm: Operations Strategy", or an equivalent course.

### **Grading and assignments**

Grades are based on (1) class participation (20%); (2) analysis and discussion of three assigned cases. The cases will be discussed in class sessions with company managers and/or at the companies where the cases take place. A 750 word written report is required for two of the cases, (i.e. Boeing and Cisco) and a short, (500 word) report is required for the third case, (i.e. Angaza) (all individual assignments) (25%); (3) analysis of a recent example of supply chain restructuring in a global company, selected from an industry in which one our companies to be visited belongs (team assignment) (20%); (4) A background report concerning one of the companies/industries that we will visit and a site visit report for that company (team assignment) (20%); and (5) a final paper offering reflections on what you observed and learned during the site visits (individual assignment) (15%). See below for further details on these assignments.

The following schedule is subject to change. Company visits will take place in Seattle, San Diego/Tijuana and various locations in the Bay Area. Case discussions, lectures and guest speakers will be scheduled at Wharton West.

| Session | Date   | Topic and Readings   |
|---------|--|--|
| 1-A     | September 7<br><br>(Wharton West)<br><br>10:00 am - 11:30 am Pacific | <b>Course Introduction – Operations Strategy</b><br><br>This session will present the goals and requirements for the course. We will then review the course schedule. Finally, we will introduce a framework for operations strategy that highlights the following concepts that will be covered in the course either in class sessions or through company visits: <ul style="list-style-type: none"> <li>○ Global Manufacturing Sourcing</li> <li>○ Supplier Relationships and Coordination</li> <li>○ Logistics and Distribution</li> <li>○ Technology and Capacity Planning</li> <li>○ Supply Chain Risk Management</li> <li>○ Agility, Flexibility Strategies</li> <li>○ Environment and Sustainability</li> <li>○ Lean operations and continuous improvement</li> </ul> <ul style="list-style-type: none"> <li>• <b>Readings</b> <ul style="list-style-type: none"> <li>○ M. Fisher, “What is the Right Supply Chain for Your Products”, Harvard Business Review, 1997.</li> <li>○ H. Lee, “Triple A Supply Chain”, Harvard Business Review, 2004.</li> </ul> </li> </ul> |
| 1-B     | September 7<br><br>(Wharton West)<br><br>11:30 am - 12:00 pm Pacific | <b>Plant Tours and Industry Background</b><br><br>This session will introduce the Plant Tour Analysis tool that will be applied in our site visits by the student teams. We will also discuss the industry background reports that each team will prepare. Each team will be required to distribute their background report prior to the site visit and a summary of the site report after each visit. <ul style="list-style-type: none"> <li>• <b>Reading</b> <ol style="list-style-type: none"> <li>1. R. E. Goodson, “Read a Plant – Fast”, HBR, May 2002.</li> </ol> </li> </ul>   |
| 2       | September 8<br><br>(Wharton West)<br><br>1:30 pm – 3:00 pm Pacific   | <b>Supply Chain Risk Management – Cisco Case Discussion</b><br><b>Guest Speaker, James Steele, Global Supply Chain Manager, Cisco</b><br><br>This session will introduce the concept of supply chain risk management. We will do so by discussing the case which describes the Cisco process and how it reacted to the Tohoku earthquake in Japan. James Steele, who was director of Cisco’s Supply Chain Risk Management program at the time of the quake, will be joining us in class to discuss Cisco’s response. <ul style="list-style-type: none"> <li>• <b>Readings</b></li> </ul>   |

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|   |  | <ul style="list-style-type: none"> <li>○ R. Anupindi, "Cisco Supply Chain Risk Management (SCRM) in Action: 2011 Tohoku Earthquake", (U. Michigan Case 1-429-284, 2013)</li> <li>○ R. Anupindi, "Supply Chain Risk Management at Cisco: Response to H1N1 (U. of Michigan case 1-428-881), – <u>read pages 2 through top of page 9.</u></li> <li>○ D. Simchi-Levi , W. Schmidt and Y. Wei, "From Super Storms to Factory Fires: Unpredictable Supply-Chain Disruptions", HBR Jan-Feb, 2014.</li> <li>○ D. Reynolds, "Lessons From Tohoku", Wharton Magazine, Winter 2012.</li> <li>○ A. Pollack and S. Lohr, "A Japanese Plant Struggles to Produce a Critical Auto Part", New York Times, April 278, 2011.</li> </ul>  |
| 3 | <b>September 9</b><br><b>(Tracey CA)</b><br><b>8:30 am –</b><br><b>4:00 pm</b><br><b>Pacific</b>             | <b>Visit to Amazon Fulfillment Center</b><br><p>This session will expose us to the technology and processes used at the San Francisco area (Tracey) distribution center for Amazon. Our agenda at the site is to gain an understanding of how Amazon manages fulfillment and logistics. We will have the opportunity to continue our discussion of Amazon strategies for supply chain, logistics and technology management at their headquarters in Seattle later on in the course.</p> <p>This will be our first site tour and the team assigned to this facility will have the opportunity to use the plant tour assessment tool.</p>  |
| 4 | <b><u>September 19</u></b><br><b>(Wharton West)</b><br><b>12:00 pm –</b><br><b>1:30 pm</b><br><b>Pacific</b> | <b>Azagna Case Discussion – Lighting up Africa &amp; Servicization and Product-Service Systems</b><br><p>We will discuss Azagna, a start-up that is providing an innovative business model for value delivery that enables the distribution of electricity in Africa to those not connected to the power grid.</p> <p>We will begin the class with a discussion of the case. We will conclude the class with a brief over-view of the Product-Service systems business model.</p> <ul style="list-style-type: none"> <li>• <b>Reading</b> <ol style="list-style-type: none"> <li>1. N. Agrawal, "Azagna: Lighting Up Africa", Santa Clara University Case, 2014.</li> <li>2. J. Guajardo, "Pay-As-You-Go Business Models in Developing Economies: Consumer Behavior and Repayment Performance", Haas School of Business, 2016</li> </ol> </li> </ul> |

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| 5 | <p><b><u>September 20</u></b><br/><b>(Wharton West)</b></p> <p><b>1:30 pm – 3:30 pm Pacific</b></p>                                | <p><b>Supply Chain Strategy for E-Commerce</b><br/><b>Jim Miller, VP Global Capacity Delivery (GCD), Google</b></p> <p>Jim will discuss the supply chain of the extensive infrastructure used by Google to deliver capacity to its users. He will also discuss current trends and strategies at Google.</p>  |
| 6 | <p><b><u>September 21</u></b><br/><b>(Wharton West)</b></p> <p><b>12:00 pm - 1:30 pm Pacific</b></p>                               | <p><b>Toyota Production System, Lean</b></p> <p>We will discuss the Toyota Production System and the concept of lean production. We will also discuss some applications of lean in the auto and health care industries.</p> <p>In addition, we will hear the Amazon visit team deliver their site report. We will also finalize industry/company group assignments.</p> <p>This is a case that was discussed in OIDD 611, so most of you will have seen it before. Review the Toyota case and consider how the Toyota Production System works (and the Andon procedure in particular). What is its impact on quality and productivity? Also, think about recent events in the auto industry that relate to quality problems. Finally, we will consider how the Toyota Production System and the lean model are being implemented in other industries and discuss a recent case at Nissan.</p> <p><b>Readings</b></p> <ul style="list-style-type: none"> <li>○ K. Mishina, “Toyota Motor Manufacturing, U.S.A., Inc.”, HBS case 9-693-019, 1995.</li> <li>○ J. Endo, “Discussion paper of Nissan’s Global Supply Chain Management Roles of Mother Plants and the Global Production Engineering Center in Japan, Revised February 16, 2015 (M. Cohen)</li> <li>○ S. Spear and H. K. Bowen, “Decoding the DNA of the Toyota Production System”, Harvard Business Review, 1999.</li> </ul> |
| 7 | <p><b><u>October 13</u></b><br/><b>Philadelphia</b><br/><b>(remote access to Wharton West)</b></p> <p><b>12:00 pm– 2:00 pm</b></p> | <p><b>Case Discussion - Boeing: The Fight for Fasteners</b></p> <p>We will discuss challenges associated with sourcing and supplier coordination encountered by Boeing in its 787 supply chain. We will also consider questions that you will want to pose to the Boeing management when we visit the Everett plant and discuss the current status of the 787 program.</p> <p>• <b>Readings</b></p>  |

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|          | <b>Pacific</b>  | <ul style="list-style-type: none"> <li>○ M. Lee and R. Anupindi, “Boeing: The Fight for Fasteners”, by (U. of Michigan case 1-428-787, 2009)</li> <li>○ C. S. Tang, and J. Zimmerman, “Mitigating New Product Development Risks – The Case of the Boeing 787 Dreamliner”, Chapter 11 in M.S. Sodhi and C.S. Tang. <i>Managing Supply Chain Risk</i>. Springer. 2012</li> </ul>  |
| <b>8</b> | <b><u>October 20</u></b><br><br><b>Philadelphia</b><br><br><b>(remote access to Wharton West)</b><br><br><b>1:30 pm – 3:30 pm Pacific</b> | <b>Global Supply Planning – Sourcing and Location Decisions</b><br><br>We will review the current situation concerning global manufacturing sourcing, including the results of a recent Benchmark study.<br><br><b>Readings</b> <ul style="list-style-type: none"> <li>○ W. C. Shih “What It Takes to Re-Shore Manufacturing Successfully”, , Sloan Management Review, Fall, 2014.</li> <li>○ “Shifts in Cost Competitiveness Reshape Global Manufacturing”, Sourcing Journal, September 05, 2014.</li> <li>○ “Yen’s Shifting Value Helps Japanese Carmakers Meet New Challenges”, Knowledge@Wharton, April 01, 2014.</li> <li>○ M. A. Cohen, S. Cui, R. Ernst, A. Huchzermeier, P. Kouvelis, H. L. Lee, H. Matsuo, Marc Steuber, A. Tsay “Benchmarking Global Production Sourcing Decisions: Where and Why Firms Offshore and Re-shore”, , OID Working Paper, 2016.</li> </ul> |
| <b>9</b> | <b><u>November 3</u></b><br><br><b>(remote access to Wharton West)</b><br><br><b>12:00 pm – 2:00 pm Pacific</b>                           | <b>Logistics Systems and Distribution Strategy</b><br><br>In the first half of this session we will discuss the management of distribution and logistics within a global supply chain. We will focus on issues associated with risk pooling, coordination and technology. We also will present insights derived from analytical models and current practices for materials management, cross-docking, and warehouse automation.<br><br>In the second half of the session the groups will present their industry background reports for the companies that we will be visiting.<br><br><b>Readings</b> <ul style="list-style-type: none"> <li>○ G. Cachon and C. Terwiesch, “Risk-Pooling Strategies to Reduce and Hedge Uncertainty”, Chapter 15 “Matching Supply with Demand: An Introduction to Operations Management”, 3<sup>rd</sup> edition, McGraw Hill, 2013.</li> </ul> |

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| <p><b>10</b></p> | <p><b><u>November 8</u></b><br/><br/><b>(San Diego)</b><br/><br/><b>7:30 am – 5:00 pm</b><br/><b>Pacific</b></p> | <p><b>Visit US Navy</b><br/>We will have the opportunity to observe logistics, maintenance and fleet support processes.</p> <ul style="list-style-type: none"> <li>○ Aircraft Carrier Visit and discuss AVCAL (logistics process)</li> <li>○ Naval Air Station – Logistics, Maintenance and Repair Operations</li> </ul>   |
| <p><b>11</b></p> | <p><b><u>November 9</u></b><br/><br/><b>(San Diego)</b><br/><br/><b>7:30 am – 3:00 pm</b><br/><b>Pacific</b></p> | <p><b>Visit to Taylor Guitar Company</b><br/>We will discuss issues of global sourcing, sustainability, product design and acquisition strategy with company managers. We will also have the opportunity to observe the guitar manufacturing process.</p> <p>Some questions to consider to prepare us for the visit:</p> <ol style="list-style-type: none"> <li>1. What does “sustainability” mean in the context of Taylor Guitars? In other words, what does Taylor Guitars try to make sustainable? Which efforts has the company made to achieve sustainability?</li> <li>2. Why did Taylor acquire Crelicam, who possesses more than half of the export quota of ebony in Cameroon? What were the potential benefits costs and risks?</li> <li>3. Taylor Guitars pioneered many manufacturing process innovations, such as introducing CNC machines and bolt-on neck system. By allowing open-to-public tours, the company also welcomes other guitar manufacturers to visit its factory and learn about these innovations. Do you agree or disagree with this strategy? What are some technologies you would recommend to share or not to share with other guitar manufacturers? Why?</li> </ol> <p>• <b>Readings</b></p> <ul style="list-style-type: none"> <li>○ Y Lin and M. Han, “Sustainable Wood Sourcing at Taylor Guitars”, University of San Diego Case, 2015.</li> <li>○ J. Dickson, “Meet your maker: Taylor's Search for the Ultimate Maple Guitar”, May 28, 2015</li> <li>○ Crelicam 2014 – company report</li> <li>○ G. Little and D. Batye, “Taylor’s 2015 600 Series From Forest to Factory”, AcousticUK, February 2015</li> </ul> <p>You can also check out the YouTube video at<br/> <a href="https://www.youtube.com/watch?v=anCGvfsBoFY">https://www.youtube.com/watch?v=anCGvfsBoFY</a></p> |



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| <b>12</b> | <b><u>November 10</u></b><br><br><b>(Tijuana)</b><br><br><b>7:30 am –</b><br><b>5:00 pm</b><br><b>Pacific</b>    | <b>Visit maquiladora factories in Tijuana</b><br><br>We will visit several factories in the area over a two-day period. The following companies have been scheduled: <ul style="list-style-type: none"> <li>• Welch Allyn</li> <li>• Medtronics</li> </ul> The following article and Wikipedia link are useful for background. <ul style="list-style-type: none"> <li>○ “Mexico’s Maquiladoras Big Maq Attack”, Economist, Oct 26th 2013</li> <li>○ <a href="https://en.wikipedia.org/wiki/Maquiladora">https://en.wikipedia.org/wiki/Maquiladora</a></li> </ul> |
| <b>13</b> | <b><u>November 11</u></b><br><br><b>(Tijuana)</b><br><br><b>7:30 am –</b><br><b>5:00 pm</b><br><b>Pacific</b>    | <b>Visit maquiladora factories in Tijuana – continued</b><br><br><ul style="list-style-type: none"> <li>• TBD – Aerospace and Defense</li> <li>• Plantronics</li> </ul>  |
| <b>14</b> | <b><u>November 14</u></b><br><br><b>Wharton West</b><br><br><b>3:00 pm – 5:00</b><br><b>pm</b><br><b>Pacific</b> | <b>Supply Chain Strategy – Garrett van Ryzin, Uber</b><br><br>Garrett van Ryzin is a professor at the Columbia Business School. He has been working with Uber as a visiting scholar for several years. He will discuss issues that include pricing and revenue management.   |
| <b>15</b> | <b><u>November 16</u></b><br><br><b>(Seattle)</b><br><br><b>7:00 am –</b><br><b>5:00 pm</b><br><b>Pacific</b>    | <b>Boeing Everett Plant Visit</b><br><br>Our agenda will include: <ul style="list-style-type: none"> <li>○ VIP plant tour</li> <li>○ Production Integration Center (supplier management and coordination)</li> <li>○ Everett Delivery Center</li> <li>○ Meeting with Boeing managers, including managers who were involved the Fasteners case - continue the case discussion</li> <li>○ Overview of current strategies for global sourcing and product development for in the 787 Dreamliner program.</li> </ul>   |
| <b>16</b> | <b><u>November 17</u></b><br><br><b>(Seattle)</b><br><br><b>8:00 am –</b><br><b>1:00 pm</b><br><b>Pacific</b>    | <b>Visit Costco</b><br><br>We will visit the main Costco Depot in Sumner and observe the role of cross-docking. We will then visit the first Costco Warehouse store. We will have the opportunity to <u>meet</u> with Costco managers at both locations and learn about the unique Costco business model.  |

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| 17 | <b><u>November 17</u></b><br><br><b>(Seattle)</b><br><br><b>2:00 pm – 4:30 pm</b><br><b>Pacific</b>       | <b>Visit Amazon Headquarters</b><br><br>We will meet with senior Operations managers to discuss current supply chain and logistics strategy issues at Amazon.  |
| 18 | <b><u>December 5</u></b><br><br><b>(Wharton West)</b><br><br><b>10:00 am – 12:00 pm</b><br><b>Pacific</b> | <b>Logistics Support Systems – Guest Speaker, Ryan Peterson, CEO, Flexport</b><br><br>Ryan Peterson, the founder / CEO will present an overview of how their product and services support global supply chain material management and global sourcing strategies.                            |
| 19 | <b><u>December 5</u></b><br><br><b>(Wharton West)</b><br><br><b>2 pm – 5:00 pm</b><br><b>Pacific</b>      | <b>Logistics / Distribution Strategy – Guest Speakers, Amy Burns, VP, Business Process Six Sigma and Brian Doyle, Sr. Director, Lean Six Sigma, McKesson Corporation</b><br><br>Company executives will present an overview of McKesson's strategy for drug and medical supply distribution. |
| 20 | <b><u>December 6</u></b><br><br><b>(Wharton West)</b><br><br><b>9:30am – 12:00 pm</b><br><b>Pacific</b>   | <b>Analytic Paper – Group Presentations</b><br><br>Each group will have 15 minutes to present an overview of their Analytic paper findings.  |
| 21 | <b><u>December 7</u></b><br><br><b>(Wharton West))</b><br><br><b>4:00 pm – 5:00 pm</b><br><b>Pacific</b>  | <b>Debrief session</b><br><br>Each student will have the opportunity to comment on lessons learned from the course.  |

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| <b>22</b> | <b><u>December 7</u></b><br><br><b>(Wharton<br/>West))</b><br><br><b>5:00 pm –<br/>6:30 pm<br/>Pacific</b> | <b>Final session and Reception</b><br><br>We will review highlights of the company visits and discuss key lessons learned.<br>We will conclude the course with an informal reception. |
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**Case Assignments (Individual assignments - 25% of your overall grade)**

**First Case Assignment - Cisco**

On March 11, 2011 a major earthquake struck Tohoku Japan. It had a devastating impact on global supply chains. Read the case, **Cisco SCRM in Action: 2011 Tohoku Earthquake**, by Ravi Anupindi (Tauber Institute, U. of Michigan case 1-429-284, 2013) and also read **Supply Chain Risk Management at Cisco: Response to H1N1** (U. of Michigan case 1-428-881), – read pages 2 through top of page 9 for a description of Cisco's approach to risk management. Prepare a 750 word paper (*plus or minus 5%; double-spaced; put word count and your name at the top*) that addresses the following questions:

1. *What are the major challenges facing Cisco as result of supply chain disruptions caused by the earthquake?*
2. *How should Cisco manage the crisis?*
3. *What metrics should be used by Cisco to support Supply Chain Risk Management? What data would you need to estimate these metrics? At what organizational level (plant, product, supply chain, business unit) would it be appropriate to apply these metrics? What may be typical uses of these metrics?*
4. *How should Cisco mitigate the impact of the disruption to their supply chain? What tradeoffs and risks should they consider and how are these related to the metrics? In particular, how can the TTR metric be used to develop a mitigation strategy?*
5. *Comment on Cisco's SCRM process and how they dealt with the Tohoku crisis. What are its major strengths? Do you see any weaknesses?*

You should also read the following articles (posted on Canvas) as you prepare your answers to the case:

1. D. Reynolds, "Lessons From Tohoku", Wharton Magazine, January 26<sup>th</sup>, 2012,
2. D. Simchi Levi, "From Super Storms to Factory Fires: Managing Unpredictable Supply-Chain Disruptions", Harvard Business Review, Jan-Feb 2014.
3. A. Pollack and S. Lohr, "A Japanese Plant Struggles to Produce a Critical Auto Part", New York Times, April 27, 2011.

Read the case and think about the assignment questions. We will discuss this case in class at Wharton West on **Sept. 8**. James Steele, who was director of Cisco's SCRM program at the time of the quake, will be joining us in class on **Sept. 8**. Your paper is due on **Sept. 15**, posted on Canvas.

**Second Case Assignment - Azagna**

Read the Azagna case study and be prepared to offer your recommendations to them in our class discussion of the case. Prepare a 500 word paper (*plus or minus 5%; double-spaced; put word count and your name at the top*) that addresses the following questions:

1. *What short term recommendations would you make to Lesley?*

2. *What long term recommendations would you make to Azagna to better compete in the market for lighting solutions in Africa? Think comprehensively about your recommendations.*

We will discuss the case in class on **Sept. 19** at Wharton West. Your report is due on **Sept. 26** posted on Canvas. You can skim the paper by Guajardo as you prepare your answers to the case:

1. N. Agrawal, "Azagna: Lighting Up Africa", Santa Clara University Case, 2014.
2. J. Guajardo, "Pay-As-You-Go Business Models in Developing Economies: Consumer Behavior and Repayment Performance", Haas School of Business, 2016

### **Third Case Assignment - Boeing**

Boeing encountered an unusual supply chain problem during its 787 Dreamliner product development and manufacturing process, related to a small and unlikely source of difficulty, namely shortages and delays in the supply of fasteners needed to hold the airframe together. Read the case, **Boeing: The Fight for Fasteners**, by Moses Lee and Ravi Anupindi (Tauber Institute, U. of Michigan case 1-428-787, 2009) and prepare a 750 word paper (*plus or minus 5%; double-spaced; put word count and your name at the top*) that addresses the following questions:

1. *What were the causes of the fastener crisis at Boeing? How was the problem ignored for so long? What effect did the 787 Dreamliner project have on fastener supply?*
2. *What are the key elements of the Fastener Procurement Model (FPM)?*
3. *Describe the material, information, and financial flows between Boeing, fastener manufacturers (suppliers) and Tier-1 partners under FPM.*
4. *Evaluate FPM from the perspective of Boeing, fastener manufacturers, Tier-1 partners, and other stakeholders.*
5. *Critique the approach taken by Boeing in implementing FPM. What problems has Boeing encountered in rolling out the FPM?*
6. *What are some of the costs, benefits and risks associated with a "customer managed inventory" strategy such as FPM.*

You should also read the article by Chris Tang, and Josh Zimmerman, **Mitigating New Product Development Risks – The Case of the Boeing 787 Dreamliner**, Chapter 11 in M.S. Sodhi and C.S. Tang. *Managing Supply Chain Risk*. Springer. 2012, as you prepare your answers to the case.

Read the case and think about the first 4 assignment questions. We will discuss this case in class, (remote session) at Wharton West on **Oct. 13**, and also during our visit to Boeing's headquarters in Seattle on **Nov. 16**, where we will have the opportunity to discuss the case with Boeing managers. Your paper, which includes answers to all 6 questions, is due on **Nov. 25**, posted on Canvas.

**Industry Background and Site Visit Report (Team assignment - 20% of your overall grade)**

Each team will be assigned to a company that we will be visiting during the semester. Prior to the visit, the team will prepare and present or distribute a report that provides background information concerning the industry and the company that we will be visiting. Topics that could be included in this report include: current competitive trends, technology developments affecting both the product and processes, the regulatory environment, etc. The team will then use the plant tour assessment tool (i.e. "Read a Plant Fast" by Goodson) to prepare a report based on the visit. The reports will be presented and/or shared with the full class after the visits. Group formations are due on **Sept. 7**, (and one group will be assigned to do the Sept. 9 Apple visit report). The same groups will be used for the analytic paper. Each group will present their industry /company background report to the class on **Nov. 3**.

Groups will be assigned for the following company visits:

Amazon

- A&D/ US Navy
- Taylor Guitar
- Maquiladora Factories in Mexico
- Boeing
- Costco

**Analytic paper (Team assignment - 20% of your overall grade)**

Prepare an analytical paper that identifies a company that has recently adjusted or modified its operations strategy concerning issues such as supply chain design and management, global sourcing, use of technology, product design, etc. and addresses the questions listed below. You will propose your choice of focal firm to the faculty for approval; we will try to avoid duplication since these papers will be a resource for the entire class once completed. Papers should be written by a group consisting of 3 or 4 students, the required length is 2,250 words (*plus or minus 5%; double-spaced; put word count and your name at the top*).

Your analysis should address the following questions:

1. *What is the current design and management of the company's supply chain and how has this design and management been affected by the recent strategy change?*
2. *What are the reasons that the company has offered for making the changes to its operations strategy?*
3. *What is your assessment of the reasons that these changes have been made?*
4. *What is the expected (or observed) impact of the strategy change on competitive position, financial performance and operation performance?*
5. *Compare and contrast to what other companies in the same industry are doing, i.e. have other companies in the industry made operations strategy changes? Are the*

*decisions of the other companies the same or different? Why? Are there trends for the industry?*

6. *What are the key challenges facing the industry with respect to supply chain sourcing, technology and competition?*

We recommend that you consider a company from one of the industries, which we will be interacting with through company visits and guest speaker sessions, (but not one of the companies we visit or from whom we host a speaker). Please indicate your first and second choices for a company/industry in advance, (**due Sept. 20**), so that we can insure that a wide range of issues and settings is covered. To the extent possible, the industry background and site visit report group assignments will be made to complement the analytic paper company topic selected. Group assignments for the analytic paper and industry / visit report will be finalized on **Sept. 21**.

**Recommended Industries:** Aerospace and Defense; Apparel; Appliances; Automobiles; Computers/Information and Communication Technologies (ICT); Consumer Electronics; Entertainment; Gaming; Logistics and Distribution; Health Care; Retail; Semiconductor Manufacturing and Semiconductor Equipment; Toys.

This paper is due on **Dec. 9**, posted on Canvas, and will be discussed **on Dec. 6** at Wharton West. Each team will be required to present a brief (10 minute) presentation describing the findings of their analytic paper.

### **Final reflection paper (Individual assignment - 15% of your overall grade)**

This individual assignment is an opportunity to reflect on what you have learned in the course and through the site visits. It is worth 30% of your grade and is due on **Dec. 15**, posted on Canvas. You should give your thoughts on 1) the current status, 2) future trends and 3) key drivers of operations strategy and sourcing decisions in the industries we visited. Our guideline for length is 750 words, roughly three pages, although this is a recommended, but not required, length; your paper can be either shorter or longer, as long as it captures your thoughtful reflections on your experience in the course.

**Detailed Schedule**

| <b>Dates</b>                     | <b>Session</b>   | <b>Location</b>   | <b>Assignment</b>  |
|----------------------------------|--|---|--|
| 8/15                             | ---  | ---   | Course application due   |
| 8/26                             | ---  | ---   | Course travel expense payment due  |
| 9/07/2016<br>10:00 am - 11:30 pm | 1-A: Opening class and Operations Strategy lecture   | Wharton West  | Read the Fisher and Lee articles.<br>Think of some current examples of the various operations strategy concepts.   |
| 9/07/2016<br>11:30 am - 12:00 pm | 1-B: Plant Tours & Industry Reports  | Wharton West  | Form groups for group assignments  |
| 9/08/2016<br>1:30 pm - 3:00 pm   | 2: Supply Chain Risk Management<br><b>Visitor: James Steele, Global Supply Chain Manager, Cisco</b>        | Wharton West  | Read the Tohuku case and the first 9 pages of the HIN1 Case.<br>Think about the assignment questions and prepare questions for our visitor, James Steele of Cisco. |
| 9/09/2016 - 8:30 am - 4:00 pm    | 3: Corporate Visit to Amazon Fulfillment Center, in Tracey, CA.  | Board bus at Wharton West<br>Travel to Tracey CA.<br>Return to Wharton West | Review the plant tour article by Goodson.<br>Note in particular how material, people and technology are managed.   |
| 9/15                             | ---  | ---   | Cisco case report is due   |
| 9/19/2016<br>12:00 pm - 1:30 pm  | 4: Azagana Case Discussion<br><b>Visitor: To be introduced in class</b>                                    | Wharton West  | Read the case and be prepared to discuss the assignment questions.<br>Guajardo paper is for background.  |
| 9/20/2016<br>1:30 pm - 3:30 pm   | 5. Supply Chain Strategy for E-Commerce<br><b>Visitor: Jim Miller, VP Global Capacity Delivery, Google</b> | Wharton West  | Come prepared with questions concerning current strategy developments at Google.   |
| 9/20/2016                        |  |   | Analytic paper topic choices due   |



|                                  |   |   |  |
|----------------------------------|---|---|--|
| 9/21/2016<br>12:00pm - 1:30 pm   | 6. Toyota Productions System, Lean                        | Wharton West                                    | Read the Toyota case and the Nissan paper by Endo. Consider how the Andon procedure works and what are its costs and benefits and its impact on quality. Also, think about recent events in the auto industry that relate to quality problems. There is no report required for this case. The Amazon Fulfillment Center group tour report will be presented. We will also finalize other group company / industry assignments. |
| 9/26                             | ---   | ---   | Azagna case report due.  |
| 10/13/2016<br>12:00 pm - 2:00 pm | 7: Boeing Fasteners Case Discussion                       | Remote Classroom (Wharton West and Wharton PHL) | Read the case and prepare the first 4 assignment questions for discussion.   |
| 10/20/2016<br>1:30 pm - 3:30 pm  | 8: Global Supply Planning – Sourcing & Location Decisions | Remote Classroom (Wharton West and Wharton PHL) | Read the articles by Shih and by Cohen et al. The other articles are for background.   |
| 11/03/2016<br>12:00 pm - 2:00 pm | 9: Logistics Systems and Distribution Strategy            | Remote Classroom (Wharton West and Wharton PHL) | Read the text chapter by Cachon and Terwiesch. Groups will present their industry reports for our Seattle and San Diego/Tijuana visits.  |
| 11/08/2016 - 7:30 am - 5:00 pm   | 10: Visit to US Navy                                      | San Diego CA                                    | We will the opportunity to observe recent technology developments, visit a ship (carrier we hope) and visit the Seals training facility to learn about their supply chain management challenges.   |

|                                     |   |                 |   |
|-------------------------------------|---|-----------------|---|
| 11/09/2016 - 7:30 am<br>- 12:00 pm  | 11: Visit to Taylor Guitar Company  | San Diego CA    | Read the background readings and watch the video.   |
| 11/10/2016 - 7:30 am<br>- 5:00 pm   | 12: Visit to two maquiladora factories. Plan is to visit Welch Allyn and Medtronic                                  | Tijuana, Mexico | This will give us an opportunity to see how “near-shoring” works in practice.   |
| 11/11/2016 - 7:30 am<br>- 5:00 pm   | 13: Visit to two maquiladora factories. Plan is to visit and A&D company and Plantronics                            | Tijuana, Mexico | This will give us an opportunity to see how “near-shoring” works in practice.   |
| 11/14/2016 - 3:00 pm<br>- 5:00 pm   | 14: Supply Chain Strategy at Uber<br><b>Visitor: Garrett van Ryzin</b>  | Wharton West    | Professor Ryzin is a visiting scholar at Uber. He will discuss their pricing and revenue management strategies  |
| 11/16/2016 - 7:00 am<br>- 5:00 pm   | 15: Visit to Boeing Everett Wa plant  | Seattle, Wa     | Our visit will include a VIP tour of the 787 factory, the Delivery Center (where customers take delivery of their aircraft) and the Production Integration Center (which handles supply chain risk and coordination). |
| 11/17/2016 - 8:00 am<br>- 1:00 pm   | 16: Visit Costco depot and warehouse store  | Seattle, Wa     | We will learn about the Costco business model and how it is supported by their logistics and supply chain policies.   |
| 11/17/2016 - 2:00 pm<br>- 4:30 pm   | 17: Amazon Headquarters   | Seattle, Wa     | We will meet with managers to discuss supply chain and logistics strategy developments.   |
| 11/25                               | - - -   | - - -           | Boeing case report due  |
| 12/05/2016 - 10:00 am<br>- 12:00 pm | 18: Logistics Support Technology Systems<br><b>Visitor: Ryan Peterson, CEO, Flexport</b>                            | Wharton West    | We will hear about technology to support global shipping.   |
| 12/05/2016 - 2:00 pm<br>- 5:00 pm   | 19: Logistics and Distribution strategy in the Pharma industry<br><b>Visitor: Amy Burns, VP, Business Process 6</b> | Wharton West    | We will learn about the distribution strategy at one of the leading distributors of drugs and medical products.   |

|                                    |  |              |   |
|------------------------------------|--|--------------|---|
|                                    | <b>Sigma, Brian Doyle, Sr.<br/>Director, 6 Sigma,<br/>Mckesson</b> |              |   |
| 12/06/2016 - 9:30 am<br>- 12:00 pm | 20: Analytic Paper –<br>Group Presentations                        | Wharton West | Each group will present a<br>summary of their analytic<br>paper |
| 12/07/2016 - 4:00 pm<br>- 5:00 pm  | 21: Debrief Session  | Wharton West | Individual comments on the<br>course                            |
| 12/07/2016 - 5:00 pm<br>– 6:30 pm  | 21: Final Session &<br>Reception                                   | Wharton West | Review highlights of the<br>course.<br>Informal reception.      |
| 12/9                               | ---  | ---          | Analytic paper due  |
| 12/15                              | ---  | ---          | Reflection paper due  |

### Optional Reading List

Note: Required readings are assigned for the lecture classes and the written assignments. All required readings will be posted on the course Canvas site. A subset of the optional readings will also be posted on the Canvas site and will be updated throughout the semester. Students are encouraged to suggest current readings to be shared with the class.

Optional readings provide: 1) recent examples of reshoring /nearshoring and insourcing, as counter-trends to offshoring and outsourcing, in a variety of firms, industries, and countries, from the business press; 2) comprehensive reports by think-tanks, consulting firms, and government agencies on the economic and policy issues surrounding manufacturing in advanced economy countries such as the U.S. and Japan; 3) examples of research articles by faculty that convey their interests and provide context for this course. Suggested books are listed as well.

- 1) Recent examples of reshoring/nearshoring and insourcing from the business press
  - a) "Mexico's maquiladoras: Big maq attack", *The Economist*, Oct 26<sup>th</sup>, 2013.
  - b) "Yen's Shifting Value Helps Japanese Carmakers Meet New Challenges", *Knowledge@Wharton*, April 01, 2014.
  - c) "Reshoring Could Create 200,000 jobs over next decade", *Financial Times*, March 11, 2014.
  - d) "UK Reshoring Faces Battle Industrialists War", *Financial Times*, January 24, 2014.
  - e) "Few US Reshorings Go Ahead, Study Finds", *Financial Times*, September 7, 2014.
  - f) "Reshoring Driven by Quality, Not Costs, Say UK Manufacturers", *Financial Times*, March 3, 2014.
  - g) "The Top Supply Chain Disasters of All Time", *Supply Chain Digest*, D. Gilmore, May 7, 2009
  - h) "Rebalancing Your Sourcing Strategy", *McKinsey & Co.*, July 2014.
  - i) A. Pollack and S. Lohr, "A Japanese Plant Struggles to Produce a Critical Auto Part", *New York Times*, April 27, 2011.
  - j) "Japan Re-Emerges in the Aerospace Arena With a New Jet", H. Tabuchi, *New York Times*, April 9, 2013.
  - k) "Requiem for a Dreamliner," James Surowiecki, *The New Yorker*, Feb. 4, 2013.
  - l) "New Problems with Boeing 787," C. Drew and J. Mouawad, *NY Times*, Dec. 10, 2012.
  - m) "Does America Really Need Manufacturing?" Gary P. Pisano and Willy C. Shih. *Harvard Business Review*, March 2012.
  - n) "Making It in America." Adam Davidson. *The Atlantic*, Jan-Feb. 2012.

- o) "Winning the Race with Ever-Smarter Machines." Eric Brynjolfsson and Andrew McAfee. *Sloan Management Review*, Winter 2012.
  - p) "Offshoring, Onshoring, and the Rebirth of American Manufacturing." Michael Dolega. TD Economics, October 2012.
  - q) "In Shift of Jobs, Apple Will Make Some Macs in U.S.," C. Rampall and N. Wingfield, *NY Times*, Dec. 6, 2012.
  - r) "Flextronics CEO Sees Hope for U.S. Tech Production," J. Hagerty, *Wall Street Journal*, January 4, 2013.
  - s) "Honda Bolsters Its Production in North America," M. Ramsey, *Wall Street Journal*, Aug. 12, 2012.
  - t) "Toyota Says No Full Production Until Year's End," H. Tabuchi, *NY Times*, April 22, 2011.
  - u) "Japanese Manufacturers Help Save Chip Maker Renesas," H. Tabuchi, *NY Times*, December 10, 2012.
  - v) "Nissan to Invest \$358 million in Thai Plant," *Yahoo News*, Nov. 9, 2012.
  - w) "Toshiba Turns Overseas to Reduce Procurement Costs," J. Osawa, *Wall Street Journal*, Aug. 16, 2010.
  - x) "Hitachi's Revival Isn't So Good for the City of Hitachi," *NY Times*, Dec. 28, 2012.
  - y) "China Loses Edge As World's Factory Floor," *Wall Street Journal*, Jan. 17, 2013.
  - z) "Hedging China Risks, Japan Firms Turn to Booming Southeast Asia," S. Grudgings, *Reuters*, Nov. 5, 2012.
  - aa) "The Insourcing Boom," Charles Fishman, *The Atlantic*, Dec. 2012.
  - bb) "Mr. China Comes to America," James Fallows, *The Atlantic*, Dec. 2012.
  - cc) "Should Manufacturing Jobs Be 'Reshored' to the U.S.?" *Knowledge@Wharton*, Sept. 26, 2012.
  - dd) "American Industry Is On the Move," S. Mallaby, *Financial Times*, Jan. 8, 2013.
- 2) In-depth reports from think-tanks, consulting firms, governments
- a) "Manufacturing Footprints: Getting to Plant X", K. O'Marah and H. Lee, SCM World, 2013.
  - b) "U.S. Manufacturing in International Perspective." Marc Levinson. Congressional Research Service, Feb. 2013.
  - c) "U.S. Manufacturing Nears a Tipping Point," Boston Consulting Group, 2012.
  - d) "Locating American Manufacturing: Trends in the Geography of Production," Brookings Institute, April 2012.
  - e) "Trading myths: Addressing Misconceptions about Trade, Jobs, and Competitiveness," McKinsey Global Institute, May 2012.
  - f) "Manufacturing the Future: The Next Era of Global Growth and Innovation," McKinsey Global Institute, November 2012.

- g) "Manufacturing's New Era: A Conversation with Timken CEO James Griffith," McKinsey and Company, December 2012.
- h) "Offshoring (Offshore Outsourcing) and Job Loss among U.S. Workers," Congressional Research Service, December 2012.
- i) "Rebalancing your sourcing strategy Offshoring is alive and well, but it's no longer the only answer," by Conradin Merk, Jonathan Silver, and Fabio D. Torrissi, McKinsey and Company, July 2014.

### 3) Faculty-authored articles

- a) "Winning in the Aftermarket," Morris A. Cohen, Narendra Agrawal, and Vipul Agrawal, *Harvard Business Review*, May 2006.
- b) "Valuing Operational Flexibility under Exchange Rate Risk," Arnd Huchzermeier and Morris A. Cohen, *Operations Research*, Vol. 44, No. 1, Jan.-Feb. 1996.
- c) "Lessons from Product Architecture Initiatives in the Global Automotive Industry," John Paul MacDuffie, *Global Strategy Journal*, Vol. 3, No. 1, 2013.
- d) "Get Ready for the Complexity Revolution," John Paul MacDuffie and Takahiro Fujimoto, *Harvard Business Review*, June 2010.
- e) "Collaboration in Supply Chains: With and Without Trust," John Paul MacDuffie and Susan Helper, chapter 10 in *The Corporation as a Collaborative Community*, Paul Adler and Charles Heckscher (editors), Oxford University Press, 2007.
- f) "Supply Chain Competitiveness and Robustness: A Lesson from the 2011 Tohoku Earthquake," Takahiro Fujimoto, Discussion Paper #362, Manufacturing Management Research Center, University of Tokyo, September 2011.
- g) H. Matsuo, "Implications of the Tohoku Earthquake for Toyota's Coordination Mechanism: Supply Chain disruption of Automotive Semiconductors", 2014.
- h) "Creating the New Global Enterprise: Transportation Panel", summary from Wharton conference on US-Japanese Manufacturing Alliances, April 7-8, 1993.

### 4) Suggested Books

- a) *Producing Prosperity: Why America Needs a Manufacturing Renaissance*. Gary P. Pisano and Willy C. Shih. Boston, MA: Harvard Business School Press.
  - b) *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*. Eric Brynjolfsson and Andrew McAfee. Lexington: Digital Frontier Press, 2011.
  - c) *The New Industrial Revolution: Consumers, Globalization and the End of Mass Production*. Peter March. New Haven: Yale University Press, 2012.
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