**Course Materials**

* Proposed course outline and supporting slides
* Example syllabus (graduate level 7-week course)
* Deloitte Digital Capabilities Model overview (slides). Also see <https://dcm.ascm.org/>
* Quiz questions
* List of cases, articles, and videos, by topic area (see following pages)

**Managing Digital Transformation**

* + - **Cases**
      * Digital Transformation at GE: What Went Wrong? Ivey Publishing, W19499
      * Michael Ku and Global clinical Supply at Pfizer Inc.: Brining Hope to Patients. Harvard Business School Publishing, 9-420-108
      * Digitalization at Siemens. Harvard Business School Publishing, 9-717-428
    - **Articles** 
      * Richard, C. and Kusters, J. (2019). Moving from the Supply Chain to the Digital Supply Network. Journal of Supply Chain Management, Logistics and Procurement, 2(1) 60-71.
      * Sanders, N. and Swink, M. (2019). Digital Supply Chain Transformation: Visualizing Possibilities. Supply Chain Management Review, 30-41.
      * Swink, M. and Sanders, N. (2020). How to Build a Digital Supply Chain: Focus on Capabilities. Supply Chain Management Review, 12-21.
      * Hartley, J. and Sawaya, W. (2019). Tortoise, not the Hare: Digital Transformation. Business Horizons, 62(6) 707-715.
      * Blumberg, S., Delaet, T. and Swami, K. (2020). Ten ‘Antipatterns’ that are Derailing Technology Transformations. McKinsey Digital, 1-13.
      * Nagle, T., Redman, T. and Sammon, D. (2020). Assessing Data Quality: A Managerial Call to Action. Business Horizons, 63(3) 325-337.
      * Competing Via the Digital Supply Chain (2016). Trends E-Magazine, 17-22.
      * Tabrizi, B., Lam, E., Girard, K. and Irvin, V (2019). Digital Transformation is Not about Technology. Harvard Business Review - <https://hbr.org/2019/03/digital-transformation-is-not-about-technology>
      * Iansiti, M. and Lakhani, K. (2014). Digital Ubiquity: How Connections, Sensors, and Data are Revolutionizing Business. Harvard Business Review, 92(11) 90-99.
      * Michel, R. (2017). The Evolution of the Digital Supply Chain. Logistics Management, 22-26.
      * Kavadias, S., Ladas, K. and Loch, C. (2016). The Transformative Business Model Managing Talent Pipelines in the Future of Work. Harvard Business Review, 91-97.
      * Zhu, F. (2020). Business Model Transformation in the Platform Age. Harvard Business School, 620-109.
      * Zhu, F. (2020). Scaling and Sustaining Platform Businesses. Harvard Business School, 620-108.
      * Gerald, K., Palmer, D., Nguyen, A., Kiron, D. and Buckley, N. (2017). Achieving Digital Maturity: Adapting Your Company to a Changing World. MIT Sloan Management Review, 1-29.
      * Gerald, K., Palmer, D., Nguyen, A., Kiron, D. and Buckley, N. (2016). Aligning the Organization for Its Digital Future. MIT Sloan Management Review, 1-27.
      * Westerman, G., Bonnet, D. and McAfee, A. (2014). The Nine Elements of Digital Transformation. MIT Sloan Management Review - <https://sloanreview.mit.edu/article/the-nine-elements-of-digital-transformation/>
      * Gerald, K., Palmer, D., Nguyen, A., Kiron, D. and Buckley, N. (2015). Strategy, not Technology, Drives Digital Transformation: Becoming a Digitally Mature Enterprise. MIT Sloan Management Review, 1-25.
      * Davenport, T. and Westerman, G. (2018). Why So Many High-Profile Digital Transformations Fail. Harvard Business Review, 2-5.
      * Salley, A., Payne, T. and Pradhan, A. (2018). Magic Quadrant for Supply Chain Planning System of Record. Gartner, 1-52.
      * Westerman, G., Bonnet, D. and McAfee, A. (2012). The Advantages of Digital Maturity Building Digital-Ready Culture in Traditional Organizations. MIT Sloan Management Review - <https://sloanreview.mit.edu/article/building-digital-ready-culture-in-traditional-organizations/>
      * Furr, N. and Shipilov, A. (2019). Digital Doesn’t Have to be Disruptive. Harvard Business Review, 84-103.
    - **Videos**

**Synchronized Planning**

**Overview**

* + - **Cases:** 
      * Pasta, Plans, and Pandemics; (unpublished, available from [m.swink@tcu.edu](mailto:m.swink@tcu.edu))
      * Bloom and Grow Asia. HKUST Thompson Center for Business Case Studies, UST059.
      * Hungry Pet: Challenges to Digital Supply Chain Innovation. IMD, IMD-7-2091.
      * Keda’s SAP Implementation. Ivey Publishing, W11024.
      * Surviving SAP Implementation in a Hospital. International Journal of Case Studies in Management, HEC132.
    - **Videos** 
      * Synchronized planning and fulfillment (Deloitte): <https://youtu.be/uKrbpecnV34>
    - **Articles**
      * Forger, G. (2019). A View from the Cloud. Supply Chain Management Review, 12-17.
      * Fountaine, T., McCarthy, B. and Saleh, T. (2019). Building the AI-Powered Organization. Harvard Business Review, 63-73.
      * Markoff, R. and Sifert, R. (2019). Is Demand Planning Ready for AI? CSCMP’s Supply Chain Quarterly - <https://www.supplychainquarterly.com/articles/1928-is-demand-planning-ready-for-ai>

**Intelligent Demand Management**

* + - **Articles**
      * Zen Ecosystems managing energy consumption of commercial buildings <https://www.businesswire.com/news/home/20200102005036/en/Zen-Ecosystems-Launches-New-Suite-of-Services-for-Sophisticated-Grid-Integration-and-Grid-Tied-Intelligent-Demand-Management>
      * JDA transforms HEMA’s SC to include accurate demand management <https://www.supplychainmovement.com/hema-transforms-its-supply-chain/>
      * RELEX forecasting demand at airport [https://www.relexsolutions.com/case-studies/whsmith/#:~:text=RELEX%20uses%20machine%20learning%20abilities,help%20improve%20sales%20forecast%20accuracy](https://www.relexsolutions.com/case-studies/whsmith/).
      * Article on using Machine Learning to improve accuracy in forecasting and planning - <https://www.altexsoft.com/blog/demand-forecasting-methods-using-machine-learning/>
    - **Videos**
      * Data-Driven Disease Forecasting: <https://youtu.be/4J9Y-ReN7EE>
      * Deloite – “What is algorithmic forecasting” - <https://www.youtube.com/watch?time_continue=12&v=9zPVS1JU55c&feature=emb_logo>
      * “What is Machine Learning” - <https://www.youtube.com/watch?v=f_uwKZIAeM0&t=14s>

**Responsive Demand/Supply Matching**

* + - **Articles**
      * IBM using weather forecasts to make contingency plans in supply chain <https://www.forbes.com/sites/stevebanker/2016/06/29/using-weather-to-improve-supply-chain-resiliency/?sh=342cd91223f2>
      * “Building Intelligent Supply Chains with AI, Analytics and Blockchain” - Industry Week article on using technologies for visibility in supply chain, which enables better responsiveness to delays / changes in supply chain - <https://www.industryweek.com/supply-chain/article/21119188/building-intelligent-supply-chains-with-ai-analytics-and-blockchain>
      * “Improve Real-Time Decision Making with Real-Time Supply Chain Data” - MSU article on using technology to provide real-time data and to improve real-time forecasts and response to supply chain disruptions (could also work for intelligent demand management)- <https://www.michiganstateuniversityonline.com/resources/supply-chain/improve-real-time-decision-making-with-real-time-supply-chain-data/>
    - **Videos**

**Dynamic Flow Optimization**

* + - **Articles**
      * Crandall, R. (2019). The View from Digital Supply Chain Control Towers. Association for Supply Chain Management - <https://www.ascm.org/ascm-insights/the-view-from-digital-supply-chain-control-towers/>
      * “Applying Active Analytics to Dynamic Replenishment” – short Forbes article on analytic solutions for replenishment - <https://www.forbes.com/sites/kinetica/2019/10/10/applying-active-analytics-to-dynamic-replenishment/#446d98bf6645>
      * “The secret to smarter fresh food replenishment? machine learning “– article on intelligent replenishment/inventory in food industry - <https://www.mckinsey.com/industries/retail/our-insights/the-secret-to-smarter-fresh-food-replenishment-machine-learning>
    - **Videos**

**Enterprise Plan Reconciliation**

* + - **Articles**
      * How Walmart grew <https://www.supplychain247.com/article/incredibly_successful_supply_chain_management_how_does_walmart_do_it>
      * “Why you should care about IBP” - Quick video breaking down Integrated Business Planning - <https://www.youtube.com/watch?v=KvqtVUFAqtg>
      * “Making the Case for Integrated Business Planning” **-** ASCM article giving reasons for, and steps to integrate executional, tactical, and strategic business plans - <http://www.apics.org/apics-for-individuals/apics-magazine-home/magazine-detail-page/2018/01/16/making-case-integrated-business-planning>
      * “The Integration Imperative For Companies Everywhere” – Forbes article on need for enterprise integration -<https://www.forbes.com/sites/sap/2020/04/15/the-integration-imperative-for-companies-everywhere/#4d19eec5605a>
      * “How Supply Chain Systems Integration Is a Game Changer” – Industry week article on using technology to integrate systems cross-functionally - <https://www.industryweek.com/supply-chain/article/22025901/how-supply-chain-systems-integration-is-a-game-changer>
    - **Videos**

**Portfolio Life Cycle Planning**

* + - **Articles**
      * “Technology for The Portfolio Lifecycle”- article breaking down challenges and needs in portfolio lifecycle technology - <https://insight.factset.com/technology-for-the-portfolio-lifecycle>
      * “A New Plan for Your New Products” - ASCM article discussing model for integrating product portfolio planning with inventory planning and other functions - <https://www.apics.org/apics-for-individuals/apics-magazine-home/magazine-detail-page/2013/01/28/a-new-plan-for-your-new-products>
    - **Videos**

**Supply Network Design**

* + - **Articles**
      * Target acquires Deliv to expand supply network <https://www.bizjournals.com/bizwomen/news/latest-news/2020/05/target-buys-shipping-tech-company-deliv.html?page=all>
      * Amazon adapting to new warehouse design to meet urban demand <https://www.wsj.com/articles/amazons-new-multistory-warehouse-aims-to-cut-delivery-times-11568113201>
      * “Amazon Supply Chain Optimization Technologies” - Amazon video describe using supply network optimization technologies - <https://www.youtube.com/watch?v=ncwsr1Of6Cw>
      * “How to Reduce Costs through Supply Chain Network Optimization” - Industry week article describing supply chain network design - <https://www.industryweek.com/supply-chain/planning-forecasting/article/21960681/how-to-reduce-costs-through-supply-chain-network-optimization>
    - **Videos**

**Connected Customer**

**Overview**

* + - **Cases**
      * Digital Transformation at GE: What went wrong?. Ivey Publishing, W19499.
      * Vispera: Visual Intelligence for Retail. Harvard Business School Publishing, 9-620-022.
      * Pepperfry.Com: Turning the Tables on Disruption. IMD, IMD-7-2023.
      * Data Analytics at Chow Tai Fook. ACRC, 19/642C.
      * IKEA Goes Online: Implications for its Manufacturing. The Case Centre, 620-0008-1.
    - **Articles**
      * Siggelkow, N. and Terwiesch, C. (2019). The Age of Continuous Connection. Harvard Business Review, 64-73.
      * Buell, R. (2019). Operational Transparency: Make Your Processes Visible to Customers and Your Customers Visible to Employees. Harvard Business Review, 102-113.
      * Bateman, A. and Bonanni, L. (2019). What Supply Chain Transparency Really Means. Harvard Business Review - <https://hbr.org/2019/08/what-supply-chain-transparency-really-means>
    - **Video**
      * Inside Alibaba: how new retail changes everything: <https://youtu.be/H9p5jaiOxD8>
      * Cemex App <https://youtu.be/udro68DQOqY>

**Self Service**

* + - **Articles**
      * “The Rise of Human Agents: AI-Powered Customer Service Automation” – Forbes article discussing using Ai in harmony with human interaction- <https://www.forbes.com/sites/bradbirnbaum/2019/06/19/the-rise-of-human-agents-ai-powered-customer-service-automation/#1cc2bc0a93f2>
      * Automating Customer Service (ad for SmartAction) - <https://www.youtube.com/watch?v=hQpJ-sLFYJU>
    - **Videos**
      * Retail Digital Supply Chains: Facing an omnichannel customer-driven landscape: <https://youtu.be/VdFx2R6diMk>
      * “How Google Contact Center AI transforms the telecommunications call center” – example of self service with Ai - <https://www.youtube.com/watch?v=42maRyNUfqM>
      * Salesforce demo of self service using Ai - <https://www.youtube.com/watch?v=mQsB4nCIMyg>

**Customized Experience**

* + - **Articles**
      * Rodriguez, B. (2018). Putting Customer Experience at the Center of Digital Transformation. MIT Sloan Management Review - <https://sloanreview.mit.edu/article/putting-customer-experience-at-the-center-of-digital-transformation/>
      * “How Travel Apps Are Using AI to Personalize the Experience” – short, recent Forbes article - <https://www.forbes.com/sites/ilkerkoksal/2020/04/04/how-travel-apps-are-using-ai-to-personalize-the-experience/#15844a1bf216>
    - **Videos**
      * McDonald’s Wants to Know Your Order Before You Do: <https://youtu.be/QLmmWUo0qCo>
      * Example of company (Sephora) using Ai to generate personalized recommendation pages to customer searches- <https://www.youtube.com/watch?v=fm1XLpX-8BU>
      * Quick NBC video on how Netflix uses algorithms/machine learning to make recommendations - <https://www.youtube.com/watch?time_continue=66&v=nq2QtatuF7U&feature=emb_logo>
      * Tech Insider video on using Ai to create personalized grocery shopping experience **-** [**https://www.youtube.com/watch?v=fKX5igoT0yI**](https://www.youtube.com/watch?v=fKX5igoT0yI)

**Customer Issue Management**

* + - **Articles**
      * “How AI is transforming customer reviews into crucial business intelligence”- Venture Beat - <https://venturebeat.com/2019/09/11/how-ai-is-transforming-customer-reviews-into-crucial-business-intelligence-vb-live/>
      * “Ai for Customer Feedback Analysis: Big Brother or a Friend?” - Technology.org - <https://www.technology.org/2019/04/09/ai-for-customer-feedback-analysis-big-brother-or-a-friend/>
    - **Videos**
      * T4 trends in CRM <https://youtu.be/djFd6t0daLc>

**Intelligent Product Tracking**

* + - **Articles**
      * IoT giving real time data of temp/location etc of cold products like food/pharmaceuticals etc across supply chain <https://www.hiotron.com/cold-chain-logistics/>
      * “Four ways to help improve the supply chain with the Internet of Things (IoT)” - quick article that touches on IoT improving customer service with real-time product data - <https://www.supplychaindigital.com/technology/four-ways-help-improve-supply-chain-internet-things-iot>
      * “Why You Need to Consider IoT in Improving Customer Experience” – short article on IoT, but looks more like a blog post **-** <https://readwrite.com/2020/01/04/why-you-need-to-consider-iot-in-improving-customer-experience/>
    - **Videos**
      * Auto Replenishment by Jabil Packaging Solutions: <https://youtu.be/GNjInM60AUw>
      * “Oracle Intelligent Track and Trace - consumer goods in Supply Chains” – Oracle video on new tracking technologies -[**https://www.youtube.com/watch?v=NHS31KqDqJI**](https://www.youtube.com/watch?v=NHS31KqDqJI)

**Monitoring and Insights**

* + - **Articles**
      * Wearable sensor technology being utilized to track COVID-19 <https://www.frontiersin.org/articles/10.3389/fdgth.2020.00008/full>
      * “Using IoT Data to Understand How Your Products Perform” - Harvard Business Review article discussing product performance monitoring for better customer experience - <https://hbr.org/2016/06/using-iot-data-to-understand-how-your-products-perform>
    - **Videos**
      * Video Ad for Microsoft 365 <https://youtu.be/m9WxF0Vq0TY>

**Product As Service**

* + - **Articles**
      * Zhu, F. and Iansiti, M. (2019). Why Some Platforms Thrive and Others Don’t. Harvard Business Review, 119-125.
      * “Platforms Are Becoming The ‘Bundles’ of the Digital Age” – Forbes article discussing benefits of smart, connected products and services - <https://www.forbes.com/sites/matzucker/2015/01/12/bundling-brands-and-big-ass-fans/#7d675ba22d7f>
    - **Videos**
      * “Product as a service - Circular economy business models” – quick video breaking down benefits of PaaS model - <https://www.youtube.com/watch?v=jZIpcGloj88&t=5s>

**Connected Field Services**

* + - **Articles**
      * “How Technology is Changing the Future of Field Technicians” - <https://www.business2community.com/strategy/how-technology-is-changing-the-future-of-field-technicians-02304220>
      * Datasharing JV to connect customers to their dynamic supply chain. Closely connected to Dynamic Fulfillment in Transportation Operations or Optimal Path Selection <https://www.sdcexec.com/transportation/press-release/21172676/omnitracs-and-trimble-collaborate-to-bring-continued-innovation-to-joint-transportation-customers>
    - **Videos**
      * Verizon Connect <https://youtu.be/EMednFQ0sIc>
      * “Deliver connected customer service with Dynamics 365 for Field Service” – Ad for Microsoft field service - <https://www.youtube.com/watch?v=JFonGXOo3ms>
      * “Connected Field Service with Microsoft Dynamics 365” – also an ad for Microsoft **-** <https://www.youtube.com/watch?v=0zWrUH1Es6M&t=17s>

**Smart Operations**

**Overview**

* + - **Cases:** 
      * Building the Digital Manufacturing Enterprise of the Future at Siemens. Harvard Business School Publishing, 9-616-060.
      * Tetra Pak: A Digitally Enabled Supply Chain as a Competitive Advantage. IMD, IMD-7-2033-T.
    - **Articles**

**Dynamic Operations Sensing**

* + - **Articles**
      * “Industrial IoT: How Connected Things Are Changing Manufacturing” – Wired short and sweet article on using IIoT for better operational data - <https://www.wired.com/wiredinsider/2018/07/industrial-iot-how-connected-things-are-changing-manufacturing/>
    - **Videos**
      * Vence virtual fencing <https://youtu.be/YFBO522d-50>
      * “Smart Sensors from SICK: Suppliers of information for Industry 4.0 | SICK AG” – this video is super cheesy, but covers operations/machine sensing technology well - <https://www.youtube.com/watch?v=gJiJhW8Ejy0>
      * “MOM and IIOT” – ad for Siemens covering smart, connected manufacturing technology -<https://www.youtube.com/watch?v=Civ5aZVJ920>

**Augmented Workforce**

* + - **Articles**
      * Levanon, G., Crofoot, E. and Steemers, F. (2020). Where are the Robots? MIT Sloan Management Review - <https://sloanreview.mit.edu/article/where-are-the-robots/>
      * Robots doing pallet transfers from multiple entrypoints <https://www.dcvelocity.com/media/videos/play/1977-automated-robotic-palletizing-system-by-silman-industries>
    - **Videos**
      * The High-Tech Vertical Farmer: not technically a factory, but it uses automation, sensors and vertical storage technologies to monitor food growth with less water and pesticides: <https://youtu.be/AGcYApKfHuY>
      * Robot-assisted packaging: 30% more productivity: <https://youtu.be/m0IcEjgUDVQ>
      * Boston Dynamics is giving its industrial robots better brains and eyes: <https://youtu.be/f6zuyK6fOsI>
      * DHS pickers wearing glasses to make scans <https://youtu.be/I8vYrAUb0BQ>
      * “Industry 4.0: Augmented reality system for production” – video showing production of a Ducati using AR - <https://www.youtube.com/watch?v=0m67O1Em7dY>
      * “Virtual and augmented reality for industrial use” – Singularity Lab video discussing benefits and uses of AR in production - <https://www.youtube.com/watch?v=cfdBgJdFC6Q>

**Digital Process Twin**

* + - **Articles**
      * Albert, M. (2019). The Digital Twin in Action. Modern Machine Shop, 80-85.
      * IBM and coca/cola collaborating on centralizing data in cloud to better operations efficiency <https://newsroom.ibm.com/2020-08-11-Coca-Cola-European-Partners-Signs-a-Multiyear-Agreement-with-IBM-to-Accelerate-its-Strategic-Transformation-Journey-with-Hybrid-Cloud>
    - **Videos**
      * Applying blockchain to customs declarations: <https://youtu.be/LeKapqAQimk>
      * “What is Digital Twin? How does it work?” - <https://www.youtube.com/watch?v=iVS-AuSjpOQ>
      * “Process optimization and business models with digital twins” – Siemens - <https://www.youtube.com/watch?v=JIYefVc_zsw>

**Operations Command Center**

* + - **Articles**
      * ArcGIS Dashboards collect and display operations data <https://www.esri.com/en-us/landing-page/product/2020/raleigh-nc-case-study>
    - **Videos**
* “Industry 4.0 with Oracle IoT Production Monitoring Cloud” – <https://www.youtube.com/watch?v=eKzzoRYXBmc>
* “Three Ways to Improve Operational Performance in Real-Time” - <https://www.youtube.com/watch?v=nNY6ISQ2zLY>

**Total Operations Synchronization**

* + - **Articles**
    - **Videos**

**Autonomous Process Control**

* + - **Articles**
      * “From Process Automation to Autonomous Processes” – Forbes - <https://www.forbes.com/sites/cognitiveworld/2020/02/14/from-process-automation-to-autonomous-process/#192276a463b6>
    - **Videos**
      * “What is Autonomous Operations?” – Big Panda quick video explaining autonomous operations - <https://www.youtube.com/watch?v=XiWmfpXKCsE>

**Intelligent Supply**

**Overview**

* + - **Cases** 
      * Coda Coffee and Bext360 Supply Chain: Machine Vision, AI, IoT and Blockchain. Thunderbird School of Global Management, A09-18-0012.
    - **Videos**
      * Trust Your Supplier using blockchain connecting CPO’s and suppliers <https://youtu.be/MLwYhE6Yt0w>
    - **Articles**
      * Garrett, R. (2017). Benefits of Digital Transformation. Supply & Demand Chain Executive, 22-25.
      * Radell, C. and Schannon, D. (2019). Digital Procurement: The Benefits Go Far Beyond Efficiency. Supply & Demand Chain Executive, 14-21.

**IS Analytics**

* + - **Articles**
    - **Videos**
      * SAP S/Hana platform that analyze company data <https://youtu.be/PP4MERLl69w>
      * “Boost your company’s profitability in the digital age with SAP Product Lifecycle Costing” – ad for SAP costing analytics technology - <https://www.youtube.com/watch?v=mW1I8sflrH4>

**Category Management**

* + - **Articles**
      * Airforce utilizing Category Management to maximize tax dollar potential <https://www.afimsc.af.mil/News/Article-Display/Article/1503781/air-force-aims-to-save-2b-improve-lethality-with-new-acquisition-approach/>
    - **Videos**
      * “Sourcing and Procurement: Maximize efficiency to deliver optimal performance” – Deloitte - <https://www.youtube.com/watch?time_continue=45&v=Wn0HMHASuFg&feature=emb_logo>

**Source Execution**

* + - **Articles**
      * Jaggaer digitizing Wendy’s ability to source from new and multiple suppliers <https://www.jaggaer.com/success-stories/qscc-advances-its-sourcing-strategy-for-wendys-restaurants/>
    - **Videos**
      * The Mobile App Modernizing the Trucking Industry: <https://youtu.be/G5-YZwGwL0w>
      * “JAGGAER Digital Sourcing” -<https://www.youtube.com/watch?v=1jh6xY2RiGU>

**Intelligent Contract Management**

* + - **Articles**
    - **Videos**
      * SAP using machine learning for smart contract/invoice reconciliation <https://youtu.be/jJXqWF1wJkw>
      * “The Role of Artificial Intelligence in Contract Management” – ContractWorks - <https://www.youtube.com/watch?v=SB-p6QkIWxA>
      * “Contract Lifecycle Management” – Apttus ad - <https://www.youtube.com/watch?v=yvVENw93hV0>
      * “Enterprise Contract Management” – Icertis - <https://www.youtube.com/watch?v=38sUrZFzLdQ>
      * “Blockchain for Contracts” – Accenture - <https://www.youtube.com/watch?v=SqwV7yhIWnw>

**Procurement and Compliance**

* + - **Articles**
    - **Videos**
      * Tradeshift GO virtual spending cards to monitor/direct employing spending <https://youtu.be/C6Fs5BAGLdE>
      * “The Future of Procurement” – KPMG - <https://www.youtube.com/watch?v=wu9od-GdrDY&t=118s>

**Invoice and Payment Processing**

* + - **Articles**
      * GEP Ai automation platform <https://www4.gep.com/sites/default/files/files/newsroom/docs/gep-launches-ai-driven-ap-automation-platform-to-significantly-cut-the-cost-of-accounts-payable.pdf>
    - **Videos**
      * “How to use RPA for Invoice Extraction and Processing” – UiPath - <https://www.youtube.com/watch?v=10_MkXNMpVw>
      * IBM blockchain solving contingent labour inefficiencies <https://youtu.be/LxIm6rNndsk>

**Supplier Collaboration**

* + - **Articles**
      * Collaboration between SCM and supplier relations app for suppliers to collab <https://www.supplychaindigital.com/logistics/supplier-collaboration-platform-tradeshift-partners-quyntess>
    - **Videos**
      * RCS global using blockchain as collaboration platform <https://youtu.be/SgFfkr4-lok>
      * “Re-Define Procurement with PwC’s Supplier Relationship Management (SRM)” - <https://www.youtube.com/watch?v=aBG8QHCIHTs>
      * “Electronic Supplier Integration” – Siemens - <https://www.youtube.com/watch?v=YIhz4-s1XSI&t=100s>

**Digital Development**

**Overview**

* + - **Cases**
      * Digitalization at Siemens. Harvard Business School Publishing, 9-717-428.
    - **Articles**
      * Unruh, G. and Kiron, D. (2019). The Environmental Benefits of Digital Design. MIT Sloan Management Review - <https://sloanreview.mit.edu/article/the-environmental-benefits-of-digital-design/>

**Common Platform Product Architecture**

* + - **Articles**
      * “Redefine How You See Products To Sell More With CPQ” – Forbes - <https://www.forbes.com/sites/louiscolumbus/2019/10/20/redefine-how-you-see-products-to-sell-more-with-cpq/#899364463667>
      * “10 Ways Machine Learning is Revolutionizing Manufacturing in 2019” – Forbes - <https://www.forbes.com/sites/louiscolumbus/2019/08/11/10-ways-machine-learning-is-revolutionizing-manufacturing-in-2019/#79bb9c532b40>
      * “Industry 4.0’s Potentials Need to be Proven on the Shop Floor” - <https://www.forbes.com/sites/louiscolumbus/2019/05/19/industry-4-0s-potential-needs-to-be-proven-on-the-shop-floor/#32011a676802>
    - **Videos**
      * What is Metal Additive Manufacturing and What Can it Do?: <https://youtu.be/NYDzsPvywPc>
      * “Ochiba OPTIONS: Configure to Order” - <https://www.youtube.com/watch?v=v5qZt1br3w4>

**Developing Collaboration Ecosystem**

* + - **Articles**
      * Chrysler using VR to accelerate development between designers and engineers <https://www.cnn.com/style/article/seymourpowell-virtual-reality-car-design/index.html>
      * “How Collaborative Platforms and Ecosystems Are Changing Innovation” - <https://www.bcg.com/publications/2019/most-innovative-companies-collaborative-platforms-ecosystems-changing-nnovation.aspx>
      * “Distributed Product Development: Mobilizing many to create one” – Deloitte - <https://www2.deloitte.com/us/en/insights/focus/disruptive-strategy-patterns-case-studies/disruptive-strategy-distributed-product-development.html>
    - **Videos**
      * SAP Enterprise Product Development. Essentially they create/host the ecosystem <https://www.youtube.com/watch?v=dEbbloIBf7g&ab_channel=SAP>

**Model-Based Definition**

* + - **Articles**
      * Ellis, D. and Schuster, F. (2019). Why Additive Manufacturing Needs Blockchain. CSCMP’s Supply Chain Quarterly - <https://www.supplychainquarterly.com/articles/1861-why-additive-manufacturing-needs-blockchain>
      * Holweg, M. (2015). The Limits of 3D Printing. Harvard Business Review - <https://hbr.org/2015/06/the-limits-of-3d-printing>
      * Boeing using 3D printing in most powerful engine yet <https://3dprintingindustry.com/news/boeing-77x-ge9x-engines-with-300-3d-printed-parts-powers-largest-twin-engine-jetliner-in-first-flight-167793/>
    - **Videos**
      * 3D Printing Is Changing the World <https://youtu.be/GV8zPtqOyqg>
      * “Why digital twins will be the backbone of the industry in the future” - Siemens – using Digital Twin for designing and developing products - <https://www.youtube.com/watch?v=ObGhB9CCHP8>
      * “Model-Based Definition in Solid Edge” – Siemens - <https://www.youtube.com/watch?v=6kijzbGThi0>

**Development Automation**

* + - **Articles**
    - **Video**
      * Deloitte Product Lifecycle Management [https](https://d.docs.live.net/4eacdc7e907594a9/Documents/https)[://youtu.be/xESgG\_VbcpM](https://youtu.be/xESgG_VbcpM)

**Design For Consumption Model**

* + - **Articles**
      * Pay as you go model for Fivetran service <https://www.datanami.com/2020/09/14/fivetran-launches-pay-as-you-go-option-for-etl/>
      * “Flexible Consumption Business Models” – Deloitte - <https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/flexible-consumption-business-models.html>
      * “The Smartest Way to Sell a Product is to Position it as a Service” – Forbes - <https://www.forbes.com/sites/rhettpower/2019/08/26/the-smartest-way-to-sell-a-product-is-to-position-it-like-a-service/#6c22d5156aa9>
      * “How IoT is Spawning Better Business Models” – Forbes - <https://www.forbes.com/sites/insights-inteliot/2018/06/27/how-iot-is-spawning-better-business-models/#67fd1e6d5984>
    - **Videos**

**Accelerated Proof Of Concept**

* + - **Articles**
    - **Videos**
      * Generative Design <https://youtu.be/E2SxqUvtpIk>
      * “Steelcase 3D Printing Furniture Prototypes” - <https://www.youtube.com/watch?v=2Nf_pw_IDB8>
      * “Prototyping product designs at Bhold Design Studio – Ultimaker: 3D Printing Story” - <https://www.youtube.com/watch?v=hAT2lgdPwEw&t=25s>

**Dynamic Fulfillment**

**Overview**

* + - **Cases**
      * Osaro: Picking the Best Path. Harvard Business School Publishing, 9-820-012.
      * Good Shepard Pharmacy and Remedi: Will this Blockchain Deliver Donated Drugs to Needy Patients?. NACRA, NA0613.
    - **Articles**
      * McDonald, R., Wu, A., Billaud, E. and Bayer, R. (2019). Evolution of the Drone Industry. Harvard Business School, 619-085.
    - **Videos**
      * How UPS Is Using Big Data To Transform Package Deliveries: <https://youtu.be/PSNIr1EMu_I>

**Automated Fulfillment Signals**

* + - **Articles**
      * “How to Improve the Retail Customer Experience Through Inventory Analytics” - Biztech - <https://biztechmagazine.com/article/2019/06/how-improve-retail-customer-experience-through-inventory-analytics>
    - **Videos**
      * “IoT in Inventory Management | Global Tech Council” - <https://www.youtube.com/watch?v=H881x-zIurY>

**Chain Of Custody And Integrity**

* + - **Articles**
      * Walmart using blockchain to track produce <https://www.techrepublic.com/article/walmart-now-uses-blockchain-to-trace-food-will-others-follow/>
      * Madnick, S. (2020). Blockchain Isn’t as Unbreakable as You Think. MIT Sloan Management Review, 61(2), 65-70.
    - **Videos**
      * “The digital technologies transforming the supply chain | Rethink Sustainability” - <https://www.youtube.com/watch?v=8pXBIKj25Xw>
      * “Walmart’s food safety solution using IBM Food Trust built on the IBM Blockchain Platform” – (looks like same example described in Deloitte powerpoint) <https://www.youtube.com/watch?v=SV0KXBxSoio>
      * “Retraced Ensures Product Authenticity with Blockchain” – using blockchain in shoe fashion industry - <https://www.youtube.com/watch?v=sxSnWavF8a4>

**Omnichannel Order Fulfillment**

* + - **Articles**
      * Gibson, B., Defee, C., Ishfaq, R. and Davis-Sramek, B. (2018). Urban Fulfillment: The Battle for City Shoppers. CSCMP’s Supply Chain Quarterly - <https://www.supplychainquarterly.com/articles/1809-urban-fulfillment-the-battle-for-city-shoppers>
      * Amazon/Whole Foods dark stores to achieve faster fulfillment [https://www.forbes.com/sites/retailwire/2020/09/08/with-new-whole-foods-amazon-commits-to-dark-stores/#6e8ed5be4928](https://www.forbes.com/sites/retailwire/2020/09/08/with-new-whole-foods-amazon-commits-to-dark-stores/)
      * “Turning Stores into Omnichannel Fulfillment Hubs” - Digitalist Mag - <https://www.digitalistmag.com/customer-experience/2018/07/18/turning-stores-into-omnichannel-fulfillment-hubs-06179482>
    - **Videos**
      * “Preparing Logistics for the Omnichannel Revolution” – DHL - <https://www.youtube.com/watch?v=sBMaRSkPIj0>
      * “Retail Digital Supply Chains: Facing an omnichannel customer-driven landscape” – Deloitte (covers omnichannel fulfillment, but also covers capabilities like “customized experience” within Connected Customer) - <https://www.youtube.com/watch?v=VdFx2R6diMk&t=10s>

**Efficient Warehouse Operations**

* + - **Articles**
      * Tompkins Robotics <https://www.supplychainbrain.com/articles/31786-tompkins-robotics-announces-t-rail-overhead-robotic-system>
      * Warehouse picking robots in face of pandemic <https://www.wsj.com/articles/companies-step-up-distribution-automation-under-pandemic-strains-11597224602>
    - **Videos**
      * DHL using VR for training employees: <https://youtu.be/QwjyyCXd514>
      * “Amazon’s new tech for warehouse safety” - <https://www.youtube.com/watch?v=VdFx2R6diMk&t=10s>
      * “Welcome to the Future: Technology 4.0 enabled automated warehouse” - <https://www.youtube.com/watch?v=pqqjss4Px3w>
      * “Amazon’s newest robots mean new jobs” - <https://www.youtube.com/watch?v=4MH7LSLK8Dk>
      * “DHL Supply Chain Asia Digital Twin Warehouse” - <https://www.youtube.com/watch?v=S4jE-h37B4I>

**Optimal Path Selection**

* + - **Articles**
      * UPS delivery route optimization <https://www.globenewswire.com/news-release/2020/01/29/1977072/0/en/UPS-To-Enhance-Orion-With-Continuous-Delivery-Route-Optimization.html>
    - **Videos**
      * “Digital Logistics Solution Demo” – Oracle - <https://www.youtube.com/watch?v=WM8HaD2WjTo>

**Adaptive Network Response**

* + - **Articles**
    - **Videos**
      * Adore Me Improves Shipping Times With Automated Order Fulfillment <https://youtu.be/nSVJhXpkLM0>
      * “The environmental cost of free two-day shipping” – Vox (interesting video mentions utilizing traffic light data to decrease carbon footprint) - <https://www.youtube.com/watch?v=5HOijUtExiM>
      * “Real-time Fulfillment with Oracle Cloud and IoT Fleet Monitoring” - <https://www.youtube.com/watch?v=E4H-fgE-yD0>

“Why is the last-mile of delivery so costly and complex?” - <https://www.youtube.com/watch?v=MOKqlXFy3YU>

**Efficient Transportation Operations**

* + - **Articles**
      * Aliakbarian, B. (2019). Smart Packaging: Challenges and Opportunities in the Supply Chain. CSCMP’s Supply Chain Quarterly - <https://www.supplychainquarterly.com/articles/1853-smart-packaging-challenges-and-opportunities-in-the-supply-chain>
      * Belloni, F. (2020). Managing in the Location-Tracking Era. MIT Sloan Management Review - <https://sloanreview.mit.edu/article/managing-in-the-location-tracking-era/>
      * FedEx collaborating with flying drone delivery <https://newsroom.fedex.com/newsroom/drone-deliveries-coming-soon-as-wing-unveils-plans-for-first-of-its-kind-trial-with-fedex-and-walgreen/>
    - **Videos**
      * Drones changing supply chains <https://www.youtube.com/watch?v=tXjTQuxC5_g>
      * “Trucking 4.0: an autonomous vehicle ecosystem” - <https://www.youtube.com/watch?v=94cvD_rnQts>
      * “E-Retail: The Last Mile Problem” – California Management Review - <https://www.youtube.com/watch?v=q-vNERAUxU8>
      * “Uber AIR: Delivering Uber Eats with Drones” - <https://www.youtube.com/watch?v=0yMv16p8FO8>
      * “Transportation Operations Management Service” – UPS - <https://www.youtube.com/watch?v=SwC0_SDlrcM>