

Supply Chain Management
Course Number: 22:799:623
Course Title: Supply Chain Digital Transformation

COURSE DESCRIPTION

A convergence of global trends over the last 25 years, comprising a global data traffic boom, growth of online users, increase in connected objects, and cloud computing has laid the foundation for the digital era. This era is predicted to bring tremendous value to business and society globally. Commercialization and rapid deployment of new technologies such as artificial intelligence (AI), blockchain, internet of things (IoT), robotics process automation (RPA), and big data analytics, have enabled traditional firms across industries to pursue digital transformation and reimagine solutions to existing business challenges to create tremendous value for their customers and partners. Digital transformation is a set of initiatives businesses pursue to create exponential value for their customers and partners. It is driven by a thorough assessment of a corporation's business objectives and strategy, and usually enabled by innovating with a combination of people, data, processes, and new and existing technologies.

Businesses worldwide are optimistic regarding the potential of business growth driven by digital capabilities¹. A World Economic Forum report states that the combined value of the digitalization already occurring industrywide has the potential to generate upwards of \$100 trillion over the next six years². That is a massive, predicted increase, representing more than a doubling of the entire global gross domestic product (GDP) today. While one should be very wary of such projections when making corporate decisions, one should also be aware of such information.

Traditional firms, regardless of size, are recognizing the disruptive potential of technology generated by industry giants and digital startups, and the resulting threat of value migration. For example, Uber, Amazon, and Tesla have met rising customer expectations while setting the standards for superior service. These technology companies have been successful in introducing frictionless service, capturing customer attention, driving out market inefficiencies, and continuously mining information for data and insight. To compete, organizations are increasingly asking the following fundamental questions: How do we stay relevant? How do we change strategy to enhance customer acquisition and attention? How fast can we move? Do we have time to shift from low-growth to high-growth business before becoming irrelevant? How do we leverage current and future assets to become the basis of information-powered new businesses?

Traditional firms now face very different circumstances than new digital businesses. They have certain legacy advantages: established brands, markets, know-how, customers, suppliers,

organizations, and cash flow. However, they rely on decades-old approaches, legacy systems, deeply embedded processes and capabilities, and deliberate execution and decision-making cultures to deliver profitable core businesses. This makes competing on customer experience, speed, agility, and lower cost a major challenge. As a result, digital transformation is often a complex and costly endeavor.

Supply chains have been continually changing for many years, but lately the pace of change appears poised to accelerate greatly as transformation drives changes end-to-end and begins to influence business decisions. The rate of transformation change will likely accelerate, and the consequences are not entirely clear at this time. Changes will probably vary by industry, and managers need to understand what is causing the changes and to be able to identify the issues/challenges involved in order to adapt, plan and survive.

This course addresses digital transformation of supply chains. As such, it discusses drivers that are impacting supply chains. These include high-speed data processing capabilities, artificial intelligence, machine learning, big data analytics, new process automation capabilities, rapid communications, cloud computing, sustainability. It draws on current information and research globally, and other authoritative sources. The teaching approach and objectives include a strong emphasis on providing students with useful content, engaging them in discussions, soliciting and asking questions, discussing practical and real-world examples, and guest speaker talks, with the goal of developing student analytic and human skills, necessary to detect changes in the business environment and to develop plans/strategies as needed. This course will consist of two parts: (i) a broad introduction to Digital Transformation across industries, with an overview of strategy, methodology, tools, and the current state in multiple industries; and (ii) Digital Transformation specific to supply chains.

COURSE MATERIALS

The basic course content will be created from open source publications posted by various authoritative sources, instructor industrial experience and knowledge, and guest speaker presentations on specific digital transformation applications. A source listing will be provided to the students prior to each course session.

LEARNING GOALS AND OBJECTIVES

This course is designed to help students develop the analytical, human, procedural, and strategic skills necessary to detect and drive physical and digital changes in the supply chain and develop implementable plans/strategies that will be needed, as described broadly in the Course Description above and in greater detail below:

- **Overview of Digital Transformation.** Students will be presented with an overview of digital transformation, what it entails, current and future states, and how to assess and implement digital transformation initiatives.

- **Process Analysis and Business Analytics.** Students will acquire a command of the impact and interaction among current drivers of supply chain transformations, allowing them to analyze processes, analyze data, identify probable changes, and develop implementable strategies. Students will demonstrate:
 - 1) Ability to identify how analysis will enable digital transformation in the entire supply chain.
 - 2) Ability to detect where changes will occur due to changes in markets, technology, or governance, to assess what those changes will be, and how they will impact supply chains.
- **Supply Chain Management.** Students will enhance their leadership and planning skills to enable them to better cope with future challenges posed by the need for digital transformation of supply chains. Students will demonstrate:
 - 1) Ability to plan, including setting goals and objectives necessary to adapt supply chain operations during a period of rapid transformation, maintenance, and evolution.
 - 2) Ability to identify risks associated with strategies developed to deal with future changes, and to develop mitigation measures where feasible.
 - 3) Ability to estimate the costs associated with planning for digital transformation.
 - 4) Ability to identify changes and enable change management.
- **Effective communication.** Students will have the opportunity to acquire effective and persuasive communication skills in demonstrating their knowledge of future supply chains by:
 - 1) Developing analytical skills to identify where and when changes to supply-chain drivers will occur and their impact, participating in discussions, preparing a supply chain transformation plan and presenting it to the class.
 - 2) Participating in class and presenting to the class their supply chain transformation plan, applying the principles and practices covered in class.
 - 3) Preparing and presenting a supply chain transformation plan as a primary exercise in communication.

PREREQUISITES

1. Course Title: Supply Chain Management Strategies. Course Number: 22:799:607
2. Course Title: Operations Analysis. Course Number: 22:799:564/580

ACADEMIC INTEGRITY

I do NOT tolerate cheating. Students are responsible for understanding the RU Academic Integrity Policy (<http://academicintegrity.rutgers.edu/>)

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don’t let cheating destroy your hard-earned opportunity to learn. See business.rutgers.edu/ai for more details.

COURSE DELIVERY

In-person and online: Each session will consist of several components, including learning objectives, assigned reading, assignments, class discussion, and links for further study. Except for the last session, each session will start with a prerecorded lecture designed to provide a general overview of that week’s topic and will also outline the questions that the students will need to discuss during the weekly session. The students will then read the assigned materials and conduct further research on the assigned topics. A live videoconference will be held each week to discuss that week’s topic. Just prior to the videoconference each student will post their speaking points and the references they used. Each student will be evaluated as to their spoken and posted contribution to the discussion (50% of grade). The following is a preliminary list of sessions and contents:

Week 1: A brief history of Digital Transformation

- Definition
 - What it should be
 - What it should not be
- Roots
 - 1960-1970: Arpanet, NC Machines, Robots, CAD/CAM, Moore's Law, Mainframes
 - 1970-1980- FMS, CADAM, JIT, Microsoft, Apple, Oracle
 - 1980-1990- LANs, Minicomputer, WLAN, SCM, ERP, Expert Systems, AI, MTV, CNN
 - 1990-2000- WWW, Netscape, AppleMac, Optical Networks, Softswitches, Amazon, Salesforce
 - 2000-2010- iPhone, Android, Cloud, AI, Alibaba, Nanocomputing, very highspeed processors, Web, AWS
 - 2010-Present- Global mobility penetration, sharing economy
- Digital Transformation Drivers
 - ERP use in back-office functions, automation
 - Processing capacity and the revival of automation and AI
 - Hosted solutions
 - Cloud solutions
 - Large global broadband capacity

- Mobility and BYOD (Bring Your Own Device)
- Plethora of web tools
- Digital Marketing - Google, Facebook
- Financial pressures on organizations
- Sustainability
- Move to value and superior customer experience
- Experience platforms and sharing economy: Uber, Lyft, Airbnb, Amazon
- Current state of Digital Transformation
 - Early movers and adopters
 - The bandwagon effects
 - Challenges with promises but fraught with dangers

Week 2: Current state in some industry verticals

- Retail
- Healthcare
 - Insurance
 - Hospital systems
 - Other Providers
- Manufacturing GE
- Technology
- Pharmaceuticals
- Shipping
- Financial Services
- Consulting

Week 3: Key technologies in Digital Transformation

- Cloud capability
- AI
- Cybersecurity
- Near-field communication
- Agile development and implementation
- Automation and automation tools
- Sensors and IoT
- Big Data analytics

Week 4: Towards Digital Transformation

- Why needed
- What and How
- Strategy and objectives
- Building blocks (due diligence review, focus areas, design plan, implementation plan)
- Funding and **ROI**
- Innovation
- Business focused enterprise architecture
- Process analysis

- o As-is, to-be
- o Cross-functional impact and bottlenecking
- o Capacity and capability analysis
- Metrics
- Software development and module or systems integration management (fail-point awareness)
- Transformation Management, Risk Management
- Quick wins
- Bold and scaled Digital Transformation
- Class Projects

Week 5: The Human Aspect of Digital Transformation

- What is it and what does it entail?
- How and why Transformations fail?
- How to prevent failures?
- Impact on the workforce
- Change Management
- Leadership assessment - type of leaders and their style
- Influencing
- Workforce skill assessment and upskilling
- Sustaining transformation

Week 6: Governance for Digital Transformation

- Board and organization governance planning
- Organization governance structure
- Pitfalls in governance
- Sustaining progress
- Student project presentations and discussions

Week 7: Digital Transformation of the Supply Chain

- Brief refresher of supply chain history, systems, vendors
- Elements of Supply Chain Management
- Current state of Supply Chain Management
- Drivers of digital transformation
- Challenges

Week 8 Student Project Initiation

- Student groups
- Project topic areas
- As-is, to-be, gap analysis
- Due diligence analysis
- Milestones and schedules pegging
- Begin project
- Guest speaker

Week 9: Where to start and how-to start

- Awareness of the need to transform
- Definition of business value, strategic review and needs, customer segments served, operational review, and financial due diligence review of the current state of the organization
- Review, assessment, and prioritization of areas of transformation
- Functional leader owned implementation plan and financial projections
- Change Management planning and implementation
- Measurement, process, technology, people infrastructure
- Rapid execution with quick wins
- Weekly, Monthly, Quarterly, Annual reviews, go, no-go, recalibrating, decision making

Week 10: Supply Chain Digital Transformation (SCDT) continued

- New business models: the sharing economy and customer expectations
- Impact of Digital Transformation on supply chains: demand planning, ordering, making, distribution, returns
- Customer journey mapping applied to SCDT
- Applying agile and lean manufacturing to SCDT
- Building scale
- Nurturing a digital culture
- Building capabilities and talent
- Case study

Week 11: Metrics

- What is being measured in supply chains and why?
- Using metrics to change business models and transformation approaches: what is working and what needs to be improved?
- Measuring performance in objectives set by stakeholders (e.g., shareholders, public, policy makers)

Week 12: Project presentations

- Student groups of up to 5 members, formed by week 8, present their recommendations for solving the SCDT topic they selected

Week 13: Future of SCDT

- What is the scope, impact and challenges of Digital Transformation in organizations, the world we live in, and our lives?
- How significant are they in terms of impact, locally and globally?
- Which areas or functions are hardest to attain?
- What are some of the largest obstacles?
- What are the likely impacts of failure to address the challenges to bring about Digital Transformation?

Week14: Course summary

- What have we covered?
- Where is there agreement and or disagreement?
- What are the key issues that we need to watch and gather more information as they evolve?
- Where are we heading and what do we need to survive?

Week 15: Final exam (50% of grade)

Other Considerations

To be successful in their professional roles and career growth, students need to understand the impact of the digital era, which is here to stay. Thus, students should be prepared with skills necessary to assess the technology landscape, plan for technology adoption, and manage people, processes, and technology changes in this era. This course is designed to develop such skills for professionals involved in managing supply chains, and classes are designed to be interactive. Many students are expected to come from a wide array of companies, and they will need to understand that any specific change in drivers or supply chain operations may impact companies differently, leading to insightful class discussions. Students will ultimately be evaluated based on their ability to explain the linkages between drivers and corporate objectives and operations, and the logic used in developing plans capable of managing changes in specific business sectors and not whether the solutions they develop will apply to all companies.

References

1. Oliver Cann, \$100 Trillion by 2025: The Digital Dividend for Society and Business, World Economic Forum, January 22, 2016.
2. Governing Digital Transformation and Emerging Technologies, Report, National Association of Corporate Directors, September 2019.

SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at ods.rutgers.edu.

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email dsoffice@echo.rutgers.edu]

[Rutgers University-Newark ODS phone (973)353-5375 or email ods@newark.rutgers.edu]

If you are *pregnant*, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email jackie.moran@rutgers.edu]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email TitleIX@newark.rutgers.edu]

If you seek *religious accommodations*, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email deanofstudents@echo.rutgers.edu]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email DeanofStudents@newark.rutgers.edu]

If you have experienced any form of *gender or sex-based discrimination or harassment*, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link: <http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7 . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at TitleIX@newark.rutgers.edu. If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email run.vpva@rutgers.edu]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via <https://temporaryconditions.rutgers.edu> .

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of *mental health* services, please use our readily available services.

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services–New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of *physical health* services, please use our readily available services.

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of *legal* services, please use our readily available services: <http://rusls.rutgers.edu/>

Students experiencing difficulty in courses due to *English as a second language (ESL)* should contact the Program in American Language Studies for supports.

[Rutgers–Newark: PALS@newark.rutgers.edu]

[Rutgers–New Brunswick: eslpals@english.rutgers.edu]

If you are in need of additional *academic assistance*, please use our readily available services.

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>]

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

- Students must sign, date, and return a statement declaring that they understand this syllabus.]