

THE UNIVERSITY OF SOUTHERN CALIFORNIA
Marshall School of Business
DSO 505 – Sustainable Supply Chains – Spring 2022

Time: Wednesdays, 3:30-6:30 pm (via Zoom)
Thursdays 6:30-9:30 pm (via Zoom)

Instructor: Dr. Christopher Gopal

E-mail: cgopal@marshall.usc.edu

Zoom office hours: By appointment

TA: Anuj Jain

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COURSE SCOPE AND OBJECTIVES

Environmental, Social and Governance (ESG) issues and performance are a critical topic of discussion, strategy and policy making in Boardrooms, Governments and International Organizations. A very large part of ESG decisions and impacts lie in the extended supply chain and, in today's environment, managing them in a proactive and cost-effective manner is critical to the success of a business. Environmental and Sustainability is a major and high-profile component of the ESG spectrum.

Environmental issues and Sustainability efforts can open many opportunities for businesses. For example, product innovation can lead to first-mover advantage, environmental product differentiation can open new markets, compliance can assure business and brand equity, green sourcing and waste reduction can reduce operating costs.

They can also present significant challenges—for instance, governments and communities imposing higher standards on pollution, conflicting national standards, restrictions on resource use and exploitation.

Complying with these mandates can result in increased operations costs, increased supply chain working capital and financing costs, supply fragility, reporting and product design costs and, in cases where different countries have different standards, loss of competitive position, jobs and unintended social consequences.

It is an important and complex set of issues and one that is critical for supply chain and trade executives.

This course will focus on Environmental issues and Sustainability in Supply Chains. Upon successful completion of this course, students will be able to:

- Explain the sustainability challenges and opportunities facing supply chains today and master relevant vocabulary and tools;
- Describe the factors that are contributing to the adoption of sustainability strategies, such as legislations that are penalizing negative environmental and social impacts, and society's expectations of business in terms of health, human rights, and the environment;
- Demonstrate that supply chains today cannot be concerned only with creating shareholder value; their performance is also measured in terms of social, environmental and economic impact;
- Explore the trade-offs and Cost-Benefits of ESG strategies in the supply chain
- Engage in introducing/adopting/expanding sustainability practices in their field of work.

The main topics covered in the course are:

- ❖ Supply Chains, sustainability concepts and frameworks, decision-making
- ❖ Sustainable design of products
- ❖ Carbon footprint and lifecycle assessment
- ❖ Closed-loop supply chains

- ❖ Supplier management
- ❖ Facilities management
- ❖ Renewable energy
- ❖ Transportation decisions
- ❖ End-of-life management
- ❖ Stakeholders, Trade-Offs and Cost-Benefits: The Supply Chain and Risk business perspective.
- ❖ Strategic sustainability implementation.

The class format includes lectures, case and concept discussions, and movie clips.

COURSE MATERIALS

Required: *Course Reader (CR)* – Package of cases and readings available at USC bookstore`.

Digital version of the course reader can be purchased at
www.universitycustompublishing.com

Handouts (HO): Handouts posted on the Blackboard.

Suggested Readings:

- ❖ *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming* edited by P. Hawken, Penguin Books, 2017.
 - ❖ *Climate Shock: The Economic Consequences of a Hotter Planet* by G. Wagner, M.L. Weitzman, Princeton University Press, 2015.
 - ❖ *This Changes Everything: Capitalism vs. The Climate* by N. Klein, Simon & Schuster, 2014.
 - ❖ *Cradle to Cradle: Remaking the Way We Make Things* by W. McDonough, M. Braungart, North Point Press, 2002.
 - ❖ *The Responsible Company* by Y. Chouinard and V. Stanley, Patagonia Books, 2012.
 - ❖ *Reinventing Fire: Bold Business Solutions for the New Energy Era*, by A. Lovins, Chelsea Green Publishing, 2011.
 - ❖ *Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage* by D.C. Esty, A.S. Winston, Yale University Press, 2006.
 - ❖ *Earth, Inc.: Using Nature's Rules to Build Sustainable Profits*, G. Unruh, HBP, 2010.
 - ❖ *The Ecology of Commerce: A Declaration of Sustainability* by P. Hawken, Harper Paperbacks, 2010.
 - ❖ *Natural Capitalism* by P. Hawken, A. Lovins, L.H. Lovins, Little, Brown and Company, 2008.
- ... and many others... You can also look at a number of journals, such as *Science*, *Nature*, *Scientific American*, etc.

COURSE POLICIES

This class will be entirely online. Students should ensure that they can access all of the online tools via Blackboard prior to the start of classes.

The course covers both quantitative and qualitative materials, and uses cases for discussion of issues and illustration of approaches. We will use Excel as a modeling/solution finding tool when addressing several topics. Active participation in class is important throughout the course.

If you are located in a time zone where the synchronous class sessions or exams fall outside the window of 7 a.m. to 10 p.m. in your local time zone, please contact me. You will not be penalized for not attending the live Zoom class sessions. The Zoom sessions will be recorded and posted on Blackboard, and you will be responsible for watching the recorded sessions and reading the required material.

Part of your grade is Class Participation. If you are attending live, this will include participating in the class discussions, sharing your comments via the Zoom Chat function, participating in the Zoom Polling and participation in the Discussion board on Blackboard. Please use your full name so that we can track your participation! If you watch the recordings in an asynchronous manner, you can email me **and** Anuj your thoughts before or after class. I will also consider participation in the Discussion board on Blackboard.

ZOOM POLICIES

Zoom is the platform used for all online sessions and online office hours. A link and instructions to join the Zoom sessions will be posted in the Blackboard Course Pages. For more information about Zoom, go to: [Zoom Support Tutorials](#)

When logging in to Zoom, you should use your full name so that I can track your attendance. While logged in, your camera should be turned on. If there is a reason that prevents you from having your camera turned on, please let me know ahead of time. Your microphone should be turned off whenever you are not participating in class discussion. You should not share the class Zoom link and/or password with anyone to avoid “Zoombombing”.

During synchronous Zoom sessions, the following netiquette is expected, as if you were in a physical classroom.

Please do:

- Log into class early or promptly
- Arrange to attend class where there is a reliable internet connection and without distractions
- Dress respectfully. Video conference business meetings are and will be the norm, so practice your professional telepresence.
- If you use a virtual background, please keep it respectfully professional.
- Display both your first and last name during video conferencing and synchronous class meetings.
- Respectfully minimize distractions by muting and or turning off video if necessary and when appropriate.
- Engage in appropriate tone and language with instructors and classmates.

Please try not to:

- Engage in a simultaneous activity not related to the class.
- Interact with persons who are not part of the class during the class session.
- Leave frequently or not be on camera for extended periods of time.
- Have other persons or pets in view of the camera.

GRADING

Group case report	25%
Group Case Presentation/Discussion	10%
Individual case analysis submission	10%
Test/Exam	45%
Class participation	10%

GROUP CASE REPORT

Please form teams of up to six persons within the first two weeks; if you do not have a team by that time, we will assign you to one. You will be working in these teams for the group assignments. Use the

“Group” option on the Blackboard to join one of the existing teams (do not create new ones as you will not be able to see the assignments!).

I shall assign a case study in advance. The case is to be discussed within your team and you will submit (as a team) a written report. I shall provide you the specific questions that must be answered in the report. Case write-ups should be at most 4 pages and single-spaced (11 or 12 point font), with appendices attached (not included in the number of pages). It should be submitted on-line through the Blackboard. Every Report must have, in the header, the Group Number and the names of the team members.

When preparing your report, imagine that you, as a consultant, have to study an organization, to identify the main issues it faces, and to propose a set of recommendations. Your written report should begin with an executive summary, about half page long, summarizing the most important problems and your recommendations (think about it as the “elevator pitch”—you have to explain the main details of your report to an executive during the elevator ride). The rest of the report should be organized as follows:

- Brief description of the company and its environment
- Brief description of the challenges and issues faced by the company
- Responses to the specific questions asked
- Overall Recommendations, rationale and suggested plan of action.

Please ensure that the above aspects are addressed and that the report is well organized with clear section and sub-section headers. Please avoid repetition of case facts and long expositions (remember the page limit)! Consider what you believe are the most important factors (and why). General solutions to specific problems will get you little credit. Creativity in analysis and suggestions that are grounded in case facts will be given high credit. Please state any assumptions made clearly.

GROUP CASE PRESENTATION/DISCUSSION

Each Group will be assigned a case study to analyze and present to the class. These Presentations/Discussions will be spread over two classes. I shall assign some questions that need to be answered in the course of the presentation. The presentation deck should be in PowerPoint with a maximum 20 minutes in duration. Please send me the decks the day before the class. Each member of the team should play a role in the presentation. Each presentation will be followed by a short Question and Comments segment from the rest of the class. The decks and presentations should follow the following format:

- Overview of the company and environment
- The challenges faced
- Responses to the specific questions posed
- Overall Recommendations, Rationale and Actions

GROUP ASSIGNMENT EVALUATION

Team assignments provide a valuable learning experience—how to work effectively and efficiently in groups, learning from others, and honing your ability to communicate to others. Although your team’s grade depends on each member’s efforts, some students can be tempted to let others carry their load. In order to provide an incentive for all students to make maximum contributions to the study group, you will be asked to grade each team member’s contributions. Your group grades will be adjusted to obtain an individual grade based on feedback about performance provided by other members of the group (see the group assessment forms posted on the Blackboard). If you do not submit your group assessment form, it is assumed that you have assigned a rating of 100% to all your group members. The forms can be submitted in person or via e-mail, but no later than the exam date.

INDIVIDUAL ASSIGNMENT

Each individual will be required to submit a short, written case analysis. I shall specify the case study in advance and the specific questions you need to address in the write-up. You should also be prepared

for a follow-up class discussion. This write-up analysis will be brief, in bullet points and to the point. The objective of the short submission is to ensure that you have read and analyzed the case. For that reason, no late submissions will be accepted.

This is an individual submission which means that you have to prepare them on your own. It is not meant to be solved in teams, so you will have to prepare and submit them individually. If you use any material outside of that provided as part of the class (from the Internet, journal articles, etc.) make sure to reference it properly; see section on academic conduct for more details.

FINAL EXAM

The Final exams are scheduled for the week of May 2nd. Details are provided in the Weekly Schedule. The questions will have several formats: multiple choice, true/false, and problems.

You will take the exam on the Blackboard; it will appear on the "Assignment" page. If you are located in a time zone where the exams fall outside the window of 7 a.m. to 10 p.m. in your local time zone, please contact me (at least two weeks prior to the exam date) so that we can arrange for an appropriate time for you to take the exam.

Once you start, you have to complete the exam in one two-hour sitting (no logout/login allowed).

If there are extenuating circumstances that prevent you from taking the test, you must discuss the reason with me before the time of the test. You will not be given a make-up test unless you obtain a permission from USC or me in advance. In addition, you must be able to document the extenuating circumstance. If you miss the test due to a medical emergency that can be documented and verified, then a make-up test will be given. Otherwise, a grade of zero will be given for the missed test. Note that a make-up test cannot be taken before the actual test date!

GRADING

Graded work will be posted on Blackboard. Disputes over graded material should be brought to my attention as soon as possible.

CLASS PARTICIPATION

Class participation requires that you do the assigned readings, analyze the cases based on the questions given and participate actively in class. I prefer substantive comments based on good analysis rather than brief, general comments that add little to the discussion and learning. Indicate you have something to say by clicking on the raised-hand icon. Be prepared to defend your suggestions or solutions!

At the same time, be aware that it's OK to ask a question that you think may be unsophisticated or uninformed. Being too shy to ask a question will only hurt your understanding of the material. You should feel that we are in a supportive and non-judgmental environment and there is no such thing as a bad question or bad response to a question. Consider also the following:

- Don't worry about impressing people; do not keep quiet not to out of concern for what others will think about what you say.
- Ask questions when you do not understand; do not assume you know what others are thinking.
- Ask for clarification if you are confused; ask clarifying questions if you do not understand a point raised.

I will use the Zoom polling feature from time to time to assess your understanding of the material. These will count towards your participation.

If you are attending the class live, you can also comment in the chatroom.

If you are not physically attending but would like to show your preparation, please provide me with your analysis/comments through email. This may include material related to the topics covered in class from

your work experience, from additional articles/videos that you have found, readings on the Blackboard, etc. You can also contact me and the TA on e-mail and set up an appointment on Zoom.

I also encourage you to participate in the Discussion board on the Blackboard, where you can discuss the case readings, post additional relevant material (readings, videos, website links, etc.), start discussion with your colleagues, and so on. At the same time, just posting “You made a great point!” or similar type of comments will not contribute much to your participation grade.

GETTING HELP

If you have questions about any aspect of the course, you can always talk to me or Anuj. You can email either of us and we can arrange to meet via Zoom or telephone for an appropriate time.

TECHNOLOGY REQUIREMENTS

The following equipment and system requirements are recommended to successfully participate in this online course:

- Computer with webcam
- Earphones or headset
- Reliable (preferably high speed) Internet connection
- Current operating system for Windows or Mac
- Current browser
 - o Google Chrome
 - o Firefox
 - o Internet Explorer (not recommended)
 - o Safari (Mac)

For technical support please see:

- USC Systems (Blackboard, USC Login, MyUSC, USC Gmail, Google Apps)
For assistance with your USC login or other USC systems, please call +1 (213) 740-5555 or email Consult@usc.edu. They are open Mon – Fri 9:30am – 5pm and weekends from 8am - 5pm (all Pacific time).
- Zoom Video Web Conferencing System (MarshallTALK)
For assistance using Zoom, go to Zoom Support Page. You may also call +1 (888) 799-9666 ext. 2. They are available 24/7.
- Marshall Systems (MyMarshall, Marshall Outlook email)
For assistance with Marshall systems, you can call +1 (213) 740-3000 Mon-Fri 8am-6pm (Pacific), email HelpDesk@marshall.usc.edu, or use our self-help service portal as shown below. The portal allows you to get immediate assistance by searching for the information you need. You can also use it to chat with a technician or input a request. To access the service portal, follow these steps:
 - o If you're using a computer or mobile device, go to MyMarshall Home Page and click the “Help” link on the upper right.
 - o Log in using your Marshall username and password.
(If you don't know your Marshall login please follow the onscreen instructions pertaining to login issues)

If your computer does not have Microsoft Word, Office 365 package is available to you free of charge and allows you to install Word, Excel, PowerPoint, Outlook, OneNote, Publisher, and Access on up to 5 PCs or Macs and Office apps on other mobile devices including tablets. Office 365 also includes unlimited cloud storage on OneDrive. To download Office 365 log into your student (University) email through a web browser, choose Settings (top right corner), and select software. If you have further questions or need help with the software, please contact the USC ITS service portal.

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on [Research and Scholarship Misconduct](#).

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086

eeotix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776

osas.usc.edu

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu

chan.usc.edu/otfp

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

STATEMENT ON TECHNOLOGY USE

Please note that communication devices such as cell phones, smart phones, tablets, etc. capable of sending and/or receiving electronic communication and all entertainment devices are to be turned off and kept off throughout the class session. Receiving or sending communication or entertainment during class disrupts the learning environment and is rude to those around you.

COURSE PLAN AT A GLANCE (TENTATIVE)

While the assignments and topics will stay the same, the emphasis and depth may change depending on the discussions in the class, current events and developments

Week	Topic	Readings	Submission and Milestones
1	Introduction – End-to-End Supply Chains, ESG and Sustainable supply chains		
2	Measuring carbon footprint	How I did it: Tiffany's CEO on Creating a Sustainable Supply Chain (CR) Future-proof your climate strategy (CR) Streamlined Life Cycle Assessment Study (Hand Dryer article on Blackboard)	Teams Finalized
3	Measuring carbon footprint Design and planning	Levi Strauss & Co. Case Study (CR) Carbon Footprint: Methods and Calculations (CR)	
4	Sourcing & Operations	What Supply Chain Transparency Really Means (CR) Dell Upcycling Plastics Innovation Case Study (CR) General Mills Commits to Sourcing 100% Sustainable Cocoa (CR)	Individual Assignment Submission
5	Sourcing & Operations End-of-life management	Delivering on the Promise of Green Logistics (CR) Greening Wal-Mart Case study (CR)	Group Case Presentation/ Discussion Set # 1
6	Operations (Contd.) Bringing it together	Unilever Case Study (CR) Climate change disrupts supply chains (CR)	Group Case Presentation / Discussion Set # 2
7	Bringing it together: Strategy, Management Trade-Offs and Decision Making	Sustainability as a Strategy (CR) Setting Your North Star and Initiating the TEN Cycle (CR)	Group Case Study Submission
	Final Exam: Thursdays 6:30 - 9:30 pm Session: Thursday, May 5 th from 7-9 pm Wednesday 3:30 pm - 6:30 pm Session: Friday, May 6 th from 2-4 pm		

DETAILED COURSE PLAN**Week 1: Introduction – End-to-End Supply Chains, ESG and Sustainable supply chains**Discussion Questions:

1. How does Environmental and Sustainability fit into the broader ESG (Environmental, Social and Governance) framework? What are the other aspects of the ESG framework and how many they conflict with each other?
2. What risks can climate-change policies pose to companies' strategies, competitive positioning, costs and returns?
3. What are some of the tactics that companies can use to make their supply chains more green and sustainable?

Week 2: Measuring carbon footprint**Readings:**

- *Future-Proof Your Climate Strategy (CR)*

Discussion Questions:

1. What risks can climate-change policies pose to companies' strategies and returns? How can internal carbon pricing help in dealing with those risks?

- *How I did it: Tiffany's CEO on Creating a Sustainable Supply Chain (CR)*

Discussion Questions:

1. Why did Tiffany's CEO embark on this strategy to create a sustainable supply chain?
2. What were his key actions and steps?
3. Do you think this will be a worthwhile and profitable strategy?

- *Streamlined Life Cycle Assessment Study (Hand Dryer article on Blackboard)*

Discussion Questions:

1. What is the purpose of the LCA?
2. What are the different stages involved in the LCA?

Week 3: Measuring the carbon footprint; Design and planning**Readings:**

- *Carbon Footprint: Methods and Calculations (CR)*

Discussion Questions

1. How would you go about assessing and calculating the carbon footprint of an organization? Or a major functional process?

- *Levi Strauss & Co.: Driving Adoption of Green Chemistry (Berkeley case #B5867)*
I shall specify the questions and format in the class

Week 4: Sourcing; Operations**Readings:**

- *What Supply Chain Transparency Really Means (CR)*

Discussion Questions:

1. *What is supply chain transparency and why is it important?*
2. *Why is transition to supply chain transparency slow?*
3. *What steps can a company take to become more transparent?*
4. *What are the benefits of supply chain transparency?*

5. What are the risks of supply chain transparency?

- *Dell Upcycling Plastics Innovation Case Study (CR)*

Discussion Questions

1. What is the business case for Dell entering the ocean plastics case?
2. Is Dell's approach capable of delivering "additionality"?
3. Continuity of supply and local economic factors were introduced as risks in the case. What other risks are associated with Dell's ocean plastics strategy?
4. How should the consortium be structured? What leadership role, if any, should Dell take?
5. Should Dell invite Competitors into the consortium? What are the risks of that?
6. Who should be responsible for certification of the supply chain? What are the risks and benefits associated with the Strategies of 3rd party certification and NGO-led, Dell-led shared consortium responsibility?

- *General Mills Commits to Sourcing 100% Sustainable Cocoa (CR)*
I shall specify the questions and format in the class.

Week 5: Operations; End-of-life management

Readings:

- *Delivering on the Promise of Green Logistics*

Discussion Questions:

1. How can collaboration on logistics help reduce your supply chain emissions?
2. Describe one example of collaboration on logistics and its benefits

- *Greening Walmart Case Study*
I shall specify the questions and format in the class.

Week 6: Operations (contd.), Bringing it together

Readings:

- *Climate Change Disrupts Supply Chains (CR)*

Discussion Questions:

1. How is climate change impacting supply chains?
2. How can companies protect their supply chains from climate impacts?

- *Unilever Case Study (CR)*
I shall specify the questions and format in the class.

Week 7: Bringing it together: Strategy, Management Trade-Offs and Decision Making

Readings:

- *Sustainability as a Strategy (CR)*

Discussion Questions:

1. What are the Motivations for Sustainability? And the characteristics of different types of Motivation?
2. What is the Luxury Trap and how can companies avoid this?

- *Setting Your North Star and Initiating the TEN Cycle (CR)*

Discussion Questions:

1. How do companies set their North Star goals? What is a STaR map and how can one use it?
2. What is the TEN cycle? And how can companies set about implementing it?
3. How can companies protect their supply chains from climate impacts?

FACULTY:**Christopher Gopal, PhD.**

Dr. Gopal has over 35 years of experience in global supply chain & operations strategy, execution, and technology in a career that has encompassed industry executive management, consulting and executive education. Dr. Gopal has held executive positions at several leading companies, including Partner & Director of Global Supply Chain & Operations Services at Ernst & Young Consulting, VP in World-Wide Operations at Dell Computer, as well as executive VP positions at Unisys, Overland Storage and SAIC. His consulting clients have included prominent global and regional companies across a range of industries, and he has also assisted in several start-up companies.

Dr. Gopal is a Member of the Defense Business Board (DBB), which provides the Secretary and Deputy Secretary of Defense, as well as other senior leaders, trusted independent and objective advice which reflects an outside private sector perspective on proven and effective best business practices for consideration and potential application to the Department.

Chris is also a Supply Chain Advisor to the Global Fund based in Geneva, a public-private organization designed to accelerate the end of AIDS, tuberculosis, malaria and COVID as epidemics.

Chris currently consults with companies, serves as the Senior Strategic Advisor at two AI-based Supply Chain and Customer Experience companies, teaches at the University of California San Diego and at the University of Southern California, where he also serves on the Advisory Board of the Global Supply Chain Management Center

Chris serves on the Advisory Board of a prominent think-tank on Industrial Competitiveness, and recently served on a White House sub-committee on Manufacturing Technologies. He has been nominated to the Supply Chain Digest "Supply Chain Gurus" panel from 2015-2020.

Chris holds a PhD from the University of Southern California (USC), and an MBA from the Cranfield School of Management, UK. He is the lead co-author of three books on Supply Chain & Operations, Dr. Gopal has spoken and served as an invited panelist at major industry forums, including the Milken Institute Global Forum, IATA World Conferences, the OMI-OECD Forum, the Harvard Business Review Forum, the SecureAmerica Institute and the USC "Learning from the Pandemic to Improve Healthcare" Symposium.