

Management and Complexity
Fall 2022
Course Syllabus

Course Overview

Managers today operate in a challenging business environment. Rapid technological change in areas from AI to digitization, environmental factors like climate change and health issues such as pandemics, to name but a few important challenges, make developing effective business strategy difficult. Much of the challenge stems from the complexity of the world in which we live. Complexity arises in systems where multiple agents—in the business context these can be individual managers, employees, companies, governments, stakeholders, etc—interact with each other and their environments. Agents and their environments are interconnected and as they interact over time they produce change both their environments and themselves. Companies, people, markets, societies, ecosystems etc are all complex systems. However, complex systems are inherently difficult to understand. Complex systems science is a transdisciplinary effort to identify and identify common phenomena in complex systems and understand mechanisms driving complexity across domains, be they biological, social or even technological.

This course introduces students to complex systems science and its implications for management practice. Limitations in our ability to understand how implications of decisions can emerge and unfold over time can complicate our ability to understand how effectively current business designs and decisions are producing intended results. The reality of a complex world means there can be no “best” strategy or decision for a business under all circumstances. Unfortunately, many of the tools we learn in studying management do not sufficiently account for the complexity of the world, substantially reducing their effectiveness in helping promote desired business outcomes. The purpose of this course is therefore to familiarize students with the complexity characterizing the modern world and with management frameworks and research for addressing those challenges in order to position them to make more effective business management and strategy decisions in the contemporary global business environment.

The course begins by introducing some central elements of complex systems science and their relevance to natural and social systems. We then work through more detailed study of specific aspects of complexity and apply this understanding to relevant management and business strategy challenges. Because standard tools and frameworks are often insufficient in complex contexts, we will also study modified and contemporary management and strategy frameworks for managing under uncertainty.

Complexity is inherently a difficult concept for the human mind to understand. To facilitate student learning, we therefore make extensive use of computational simulation modeling techniques to explore important concepts and derive management strategy implications from the models. Students will also participate in group simulation exercises to experience how individual and business decision making can produce aggregate business and social outcomes. These experiences will enable students to better understand important dimensions of complexity and how to use that knowledge toward development of business strategy.

Learning Objectives

- Students will become familiar with the general concept of complexity and understand its relevance in natural and social systems
- Students will understand important ways in which complexity influences management and business strategy design, decisions and outcomes
- Students will develop skills applying computational simulation modeling to understand complexity in domains relevant to management and business strategy
- Students will become familiar with management frameworks and research for addressing the challenges posed by complexity to business

Course Schedule

Week	Topic	Reading
1	Course introduction: Why study complexity for business?	Page: Prelude and Chapter 1: Beginning, Characterizing Diversity, Complexity (<i>all sections after Complexity are optional</i>)
2	Complexity and Modeling	O'Sullivan & Perry: Chapter 1
3	Organizations and complexity	Robertson & Caldart: Chapter 5.1-5.4, Chapter 6
4	Variation & Selection	Page: Chapter 3
5	Topography I: Space	Robertson & Caldart: Chapters 2.4, 3.7-3.8
6	Topography II: Networks	Robertson & Caldart: Chapters 4.1-4.2 Mitchell: p. 227-252
7	Dynamics of competition	Robertson & Caldart: Chapters 3.1-3.4
8	Robustness	Page: Chapter 5 Dasgupta: Chapters 2.7-2.8, 3.1-3.4
9	Market environment dynamics	Robertson & Caldart: Chapters 3.5, 5.5 Bromiley & Rau: p. 71-73, Chapter 6
10	Diffusion processes	Centola: Chapters 2 & 3
11	Business-natural environment systems	Dasgupta: Chapters 2.1-2.4, 4.1-4.2
12	Regulation for social systems	Anderies & Janssen: Chapter 1.1-1.4, Chapter 7
13	Social-technological transitions	Geels, F. W. (2005). The dynamics of transitions in socio-technical systems: a multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860–1930). <i>Technology analysis & strategic management</i> , 17(4), 445-476.
14	Course Wrap up: Doing business in a complex world	Robertson & Caldart: Chapter 5.6
15	Final Exam	

Please note that course schedule and all contents are tentative and subject to additions and/or change: students should always refer to previous week's lecture/slides for exact assignments

Textbooks

Anderies, J., & Janssen, M. (2016). *Sustaining the commons*. Arizona State University.
<https://sustainingthecommons.org/>

*Bromiley, P., & Rau, D. (2018). *Behavioral strategic management*. Routledge.

Centola, D. (2018). *How behavior spreads: The science of complex contagions*. Princeton University Press.

Dasgupta, P. (2021). *The economics of biodiversity: the Dasgupta review*. HM Treasury.
<https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>

*Mitchell, M. (2009). *Complexity: A guided tour*. Oxford University Press

*O'Sullivan, D., & Perry, G. L. (2013). Spatial simulation: exploring pattern and process. John Wiley & Sons.

*Page, S. (2010). Diversity and complexity. Princeton University Press.

*Robertson, D. A., & Caldart, A. A. (2009). The dynamics of strategy: Mastering strategic landscapes of the firm. OUP Oxford.

*** *electronic copy available through Waseda University Library via online WINE search***

Grading

- Quizzes (26%: 13 quizzes, 2% each)
- Group Discussion Questions (22%: 2% x 11 assignments)
- Written assignments (18%: 6% x 3 assignments)
- Final Exam (34%)

Please contact the instructor with any questions about the course

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