Engineering Tripos Part IIA, 3E11: Environmental Sustainability & Business, 2024-25

Module Leader

Prof Lucia Reisch [1]

Lectures

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Lab Leader

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Timing and Structure

Lent term

Content

[Full syllabus document on moodle] [2]

Sustainable markets are in urgent need of a fundamental realignment of business practices and system-wide innovation. Today's global challenges, such as climate change, biodiversity loss, plastic and chemical environmental pollution, and inequality in access to safe and healthy workplaces, demand immediate attention. This course will explore the challenges and opportunities for businesses to develop, integrate, and promote more environmentally and socially sustainable practices, processes, and policies.

The course will focus on three main strategies of sustainable business practices, each of which is essential for businesses to operate in a socially and environmentally responsible manner.

1. First, businesses need to *reduce the negative ecological impact* of their activities to stay within planetary boundaries; innovations mitigating and adapting to climate change are essential, and engineering for sustainability is one approach.
2. Second, ensure that the *social impact* of the business is positive and welfare-enhancing for employees, customers, and societies overall; no one in the supply chain should be left short of life's essentials; providing fair and safe working conditions increases workers' motivation and trust, and resilience of supply chains.
3. Third, design and ensure *good governance* and *due diligence* in all business processes; sustainability strategies should be aligned with the business model and challenges the respective industry faces.

These dimensions are discussed under ESG (Environmental-Social-Governance), a framework that has gained momentum in the past years in product/service and capital markets. While the ‘E’ has long dominated the corporate sustainability agenda, today, many businesses aim to deliver on the ‘S’ and the ‘G’ equally, expanding the scope from planet to people, politics, profits, and governance issues.

The current global polycrisis – climate change, biodiversity loss, rising geopolitical conflicts, energy, and food insecurity – and the threats of existential risks have the power to disrupt markets and value chains. These global issues have concrete impacts on the local level and present significant business challenges. The more compelling the scientific evidence becomes (for example, the reports of the Intergovernmental Panel for Climate Change,

IPCC), the more ambitious the attempts to mitigate and manage these risks via regulation (for example, the European Green Deal), economic incentives (for example, the US Inflation Reduction Act), and agreements on national and multinational levels (for example, the UN Sustainable Development Goals). This, in turn, means a more demanding regulatory framework for businesses, small and large. The business world responds with green and social innovation for products and processes, higher sustainability standards and goals, and various business initiatives to promote market sustainability. However, there is also Greenwashing and political lobbying against transformation to secure vested interests. On consumer markets, consumers are torn between (inflation-fuelled) price consciousness and demanding businesses prove their environmental and social ‘license to operate’.

This is the backdrop for this course. In the eight sessions, we will explore the concepts, frameworks, and models available for businesses to develop managerial solutions for more sustainable markets. We will examine strategies, approaches, and tools for managing environmental and social sustainability (so we cover a broader scope than the course title suggests). We will learn about the positive and negative, intended and unintended impacts businesses have on the sustainability of markets, societies, and stakeholders (such as employees, consumers, and people along global supply chains). We will assess opportunities for change within a business's operations, ranging from better products to better processes and policies.

As a red thread that guides us through the course, we will particularly (but not exclusively) use examples from the *automotive industry*—a high-technology industry with innovative products, marked environmental impact, global and complex supply chains, high raw material dependency, and substantial economic and societal value that is highly regulated and, in some countries, heavily subsidised.

After taking this course, you will be able to understand the framework of systems and stakeholders in which business operations are embedded. You will be able to help organisations integrate environmental and social sustainability into their operations and design more sustainable business processes and product-service bundles (‘ecological engineering’). You will also learn to use ‘behavioural insights’ (or nudges) to initiate change in organisations and markets.

Overview of Course Sessions

Session 1 (23/01/25): What is at stake – and why sustainable business conduct matters. Lucia A. Reisch

Session 2 (30/01/25): Sustainability as a system condition: Doing business in times of climate change within planetary boundaries. Lucia A. Reisch

Session 3 (06/02/25): Can commerce mimic nature? The promises of a circular economy. Guest: Efty Altsisiadis

Session 4 (13/02/25): How to manage, measure, and monitor corporate sustainability: Is ESG still valid? Lucia A. Reisch

Session 5 (20/02/25): Driving sustainability through strategy: Practical applications of ESG. Guest: Leonie Decrinis

Session 6 (27/02/25): Introduction to entrepreneurship. Building Sustainable Ventures for Lasting Impact Guest: Monique Boddington

Session 7 (06/03/25): How to promote greener markets with behavioural insights? Nudging for Good. Guest: Malte Dewies

Session 8 (13/03/25): Sustainable Engineering and Digitisation: Do the benefits outweigh the costs? Guest: Billy Shi

Note: Session 8 will also offer time to prepare for the final exam.

Aims

Students will gain an understanding of the following key areas:

- Businesses as actors in the system view of the ‘Doughnut Economy’.

- The motivation of corporations to go beyond ‘The business of business is business’ and what Sustainable Engineering can mean.
- The dimensions of ‘Environment-Social-Governance’ and how to select, measure, and monitor respective sustainability goals.
- The tools and strategies for corporations to develop sustainable business practices and processes (with real-world examples from the automotive industry).
- The practical challenges and opportunities facing businesses in integrating sustainability into their operations and value chains.
- The policies that governments and the regulatory environments can implement to promote more sustainable business practices.

The skills gained in this course include (but are not limited to) fostering the ability to

- know and apply different approaches to measure ecological footprint and handprint,
- understand and evaluate tools of ESG management,
- assess critically sustainability metrics, business reporting and information, and the sustainability strategies of corporations; detect Greenwashing and Whitewashing,
- apply a ‘behavioural lens’ to promote behaviour change in organisations,
- learn how to use scientific literature and write academic essays.

Further notes

Teaching Methods

Pre-class assignments are discussed in class, including online games and simulations; interactive lectures; guest talks from experts.

Coursework

Your grade will be determined **by exam only**. The university exam takes place at the end of May and will last 1.5 hours. There will be *three* questions, of which *two* must be answered. You will receive more guidance on the exam during class and supervision. *Please check Moodle for example, questions from recent years.*

In addition, you may submit one piece of *coursework* by **15 March 2025**. The coursework consists of an academic essay of max. 2,000 words. The topics will be provided at the beginning of the course. The coursework is your chance to get personalised feedback and develop your essay-writing skills. *Please check Moodle for an information sheet on Coursework and Essays.*

Booklists

Please refer to the Syllabus PDF and Moodle

Examination Guidelines

Please refer to Form & conduct of the examinations [3].

Last modified: 04/01/2025 07:24

Links
[1] mailto:lr540@cam.ac.uk
[2] https://www.vle.cam.ac.uk/mod/resource/view.php?id=18798391
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