Engineering Tripos Part IIB, 4E3: Business Innovation in a Digital Age, 2021-22

Module Leader
Karla Sayegh [1]

Timing and Structure
Michaelmas term. Assessment: Coursework / 1 Individual Paper 100%

Aims
The aims of the course are to:

- Analyse the approaches, challenges and trade-offs involved in developing and implementing digital innovation
- Examine how digital technologies such as platforms, artificial intelligence (AI) and big data are transforming work and organizations.

Objectives
As specific objectives, by the end of the course students should be able to:

- understand the distinctive characteristics of digital technologies
- explain how digital platforms have changed strategic thinking, firm economics and business models
- analyse how different types of organizations can create, navigate and leverage ecosystems for innovation
- evaluate the potential of data and algorithms in transforming knowledge work
- explain the mechanisms and challenges of knowledge collaboration for innovation
- explain the benefits and challenges of open innovation in established firms
- understand the planned and unintended consequences of digital technologies in organizations
- think critically about the organisational and societal challenges triggered by the emergence of new technologies

Content
Today, household names such as Apple, Alphabet (Google), Facebook and Amazon continue to outperform their competitors and dominate markets. A core reason: digital innovation. Now more than ever, emerging digital technologies, such as robotics, cloud computing, web-enabled platforms and sophisticated learning algorithms that exploit massive digital trace data, are enabling innovation in unprecedented ways. Digital innovation has not only transformed products and services but has also upended business models, ways of working, forms of organizing and the ability to access ideas and expertise beyond organizational boundaries. However, digitally-enabled innovation is challenging because organizations may need to shift away from the very capabilities that underpinned their past successes. In the digital era, managers and professionals need to think differently about fundamental aspects of their business such as its strategy and associated business models, marketing approaches, culture change, the coordination of expertise and organisational structure.

In this module, you will analyse the approaches, challenges and trade-offs involved in developing and implementing digital innovation. You will also examine how digital technologies such as digital platforms, artificial intelligence (AI) and big data are transforming work and organizations. You will learn by analysing real-world problems and situations across a range of organizations and industries through case studies. Class time will be...
devoted primarily to applying key concepts and analytical tools via case discussions.

MODULE OUTLINE

Session 1: Introduction to innovation in a digital age
- Understanding what innovation means
- Identifying the distinctive characteristics of digital technologies
- Introduction to the course, what to expect and how we will work

Pre-reading


Supplemental reading


### Session 2: Digital innovation: Platforms and ecosystems

- Understanding the new logic platforms: strategy, structure, business models
- Platform strategy – how to launch a platform
- Leveraging ecosystems

#### Pre-reading

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#### Case Study

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### Session 3: Platforms and ecosystems (cont’d)

- How to launch a platform
- How to grow and scale a platform
- The importance of context

#### Pre-reading

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#### Case Study

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**Supplemental reading**

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**Session 4: Data and Algorithms**

- Big data and business intelligence
- Ethical issues of algorithmic and data-driven ways of working
- AI and organizations: decision making, power and control

**Pre-reading**

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**Session 5: Open innovation**

- What is open innovation
- Crowdsourcing
- Challenges to open collaboration

**Pre-reading**

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Session 6: Knowledge collaboration for Innovation

- The role of knowledge in innovation
- Producing novel products, services and processes across knowledge boundaries
- Cross-functional teams and complex collaboration

**Pre-reading**

“Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries”  
*Organization Science*.


**Case Study**

Garvin, D. and Taahilyani, R. (2011)  
“Mindtree: A community of communities.”  
*Harvard Business Publishing*.

Session 7: Digital innovation and the changing nature of work and organising

- Technology bringing about new ways of working and organizing
- Collaborating with technology
- Organizational and cultural barriers and enablers to digital innovation

**Required reading**

“Unto the breach: What the COVID-19 pandemic exposes about digitalization.”  
*Information and Organization*, 31(1).

“Beyond design and use: How scholars should study intelligent technologies.”  
*Information and Organization* 30(2).

Pisano, G. (2019)  
“The Hard Truth About Innovative Cultures.”  
*Harvard Business Review*.

**Case study**

Make way for the algorithms: Symbolic actions and change in a regime of knowing.  

Session 8: Student presentations
Learning points of the session:

- Practice presentation skills
- Receive feedback on individual paper
- Practice reviewing skills

Preparation before the session:

Prepare the slides of your presentation (10 min) and practise.

Send your slides to the lecturer and to your reviewer by Monday November 30 at 500pm.

Read the slides of your classmate and prepare feedback (max 5 min).

During the session:

You will present the main ideas of your paper to the class.

You will receive feedback from the lecturer and a classmate.

You will provide feedback to each other on how each paper can be further developed.

Further notes

REQUIRED READING

All students are required to read a number of articles (~3-4) before each session. There are three types of readings:

- **Academic journal articles.** Articles in peer-reviewed academic journals focused on producing novel theoretical contributions to the field of organisational studies and information systems.

- **Practitioner articles.** Based on research, these articles focus on the implications of theory for the practice of management. They often provide actionable guidance regarding salient organisational issues or problems.

- **(Teaching) Case studies** are analytical narratives of real-world business problems/challenges/dilemmas facing a protagonist in an organization. They are designed to offer valuable, contextualized application of concepts and analytical tools. Learning is achieved through collective in-class discussion based on analysis, data-driven argumentation and creative exchanges. Cases provide the context for problem framing, external/internal analysis and well-argued solutions. They also allow for concepts and frameworks to be applied in order to arrive at well-reasoned recommendations.
Coursework

The 4E3 module will be assessed by the following means:

- **Written paper, individual** (100% of total mark). This component of the assessment is made up of a final term paper.

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<td>Final term paper</td>
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The individual paper assignment will include a 2,500-3,000 word paper on an agreed upon topic. Students will investigate and report on how digital technology is driving innovation and change in a particular industry or domain of the student's choosing (e.g. digital goods in the entertainment sector, mobile applications in banking, etc.). Students are expected to apply the concepts discussed in class and where appropriate, explicitly draw on the articles provided in the module as well as other relevant articles from their own research. The written submission needs to be grounded in the appropriate literature on the topic. Please, make sure that your work is carefully referenced in accordance with the Harvard system. ([http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-a...](http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-a...)) [2].

**Learning objectives:**

- Deepen understandings of the concepts, frameworks and/or tools on digital innovation.
- Apply approaches and lessons learned from the class to a specific phenomenon.
- Improve analytical and writing skills.

**Examination Guidelines**

Please refer to [Form & conduct of the examinations](http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-a...). [3]

**UK-SPEC**

The [UK Standard for Professional Engineering Competence (UK-SPEC)](http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-a...) [4] describes the requirements that have to be met in order to become a Chartered Engineer, and gives examples of ways of doing this.

UK-SPEC is published by the Engineering Council on behalf of the UK engineering profession. The standard has
been developed, and is regularly updated, by panels representing professional engineering institutions, employers and engineering educators. Of particular relevance here is the 'Accreditation of Higher Education Programmes' (AHEP) document [5] which sets out the standard for degree accreditation.

The Output Standards Matrices [6] indicate where each of the Output Criteria as specified in the AHEP 3rd edition document is addressed within the Engineering and Manufacturing Engineering Triposes.

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Links
[1] mailto:k.sayegh@jbs.cam.ac.uk