Engineering Tripos Part IIB, 4E3: Business Innovation in a Digital Age, 2019-20

Module Leader

Stella Pachidi

Timing and Structure

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

Aims

The aims of the course are to:

- Get acquainted with the practices and processes of innovating in the digital era.
- Get exposed to various impacts of digital innovations on individuals, organisations and industries.
- Develop a critical thinking about the role of technology in social and organisational change more generally.

Objectives

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

- understand different aspects of business innovation, including product innovation, process innovation and business model innovation
- understand the distinctive character of digital technologies as integral enablers of digital innovation
- get acquainted with the organisational aspects of digital innovation
- understand digital platform thinking
- explore how organizations create ecosystems to innovate
- get to know the possible advantages and challenges of analytics and big data
- critically reflect on how data-based practices influence decision making and power relations
- understand how digital technologies allow for the emergence of new work and organisational practices
- analyse how digital innovation relates to industry transformation
- think critically about the organisational and societal changes triggered by the emergence of new technologies
- understand how IT helps organisations improve their internal operations and achieve competitive advantage
- analyse how organisational members appropriate new technologies introduced in the workplace
- critically assess how digital technologies afford new ways of organising and change the nature of work
- understand how open innovation can help organizations enhance their innovative capabilities

Content

The aim of this course is twofold: First, students will get acquainted with the practices and processes of innovating in the digital era. Second, students will be exposed to various impacts of digital innovations on individuals, organisations and industries, and will develop a critical thinking about the role of technology in social and organisational change more generally.

The course examines how firms are adopting a plethora of images for innovation in order to effectively compete...
globally in a digital age. Innovation is recognised as a multi-dimensional concept which must be strategically managed in the firm. Process innovation remains important and is increasingly enabled by knowledge and service design. Furthermore, firms must be creative in developing a more holistic view of business model innovation if they hope to achieve some level of sustainable competitive advantage. In so doing, firms are adopting new strategies and are increasingly looking at different forms of collaboration and partnering across the globe. They need to develop strategies for leveraging university-industry partnerships particularly where emerging industries are developing. Firms should also develop an open approach to innovation in both opening up their innovations for collaborative exploitation by partners, as well as developing competence and capabilities in building and leveraging an ecosystem for innovation. Finally, firms are increasingly seeking to innovate in new markets in the most unlikely of places, such as at the ‘bottom of the pyramid’. These approaches to innovation require a shift in mindset, significant experimentation and the formation of new local-global collaborative partnerships for innovation.

LECTURE SYLLABUS

Session 1: Tuesday 15 October, 16:00-18:00
- Introduction to Innovation in a Digital Age
- Structure: lecture and class discussion

Session 2: Tuesday 22 October, 16:00-18:00
- Digital Innovation: Platforms and Ecosystems
- Structure: lecture and class discussion

Session 3: Tuesday 29 October, 16:00-18:00
- Data and Information in the Digital Age
- Structure: lecture and class discussion

Session 4: Tuesday 5 November, 16:00-18:00
- Business model innovation and industry transformation
- Structure: lecture and class discussion

Session 5: Tuesday 12 November, 16:00-18:00
- Knowledge and Innovation
- Structure: lecture and class discussion

Session 6: Tuesday 19 November, 16:00-18:00
· Digital Innovation and the changing nature of work and organising
· Structure: lecture and class discussion

Session 7: Tuesday 26 November, 16:00-18:00
· Open innovation
· Structure: lecture and class discussion

Session 8: Tuesday 3 December, 16:00-18:00
· Student presentations
· Structure: individual presentations and class discussion

Session 1: Introduction to Innovation in a Digital Age
Session 1: Introduction to innovation in a digital age

Learning points of the session:

- Introduction to the course, what to expect and how we will work
- Examining the concept of innovation and how we can conceptualise it
- Understand the relevance of innovation to business in today’s dynamic world
- Understand disruptive innovation
- Discuss the shifting role of digital technology
- How digital technologies change the way companies innovate
- The range of transformations triggered by digital technology

Mandatory reading material and preparation before the session

Background reading
Garud, R., Tuertscher, P., & Van de Perspectives on innovation processes. The Academy of
Session 2: Digital Innovation: Platforms and Ecosystems

Session 2: Digital innovation: Platforms and ecosystems

Learning points of the session:

- What is digital innovation?
- The architecture of digital innovation
- Generativity and digital platforms
- Innovating in ecosystems

Mandatory reading material and preparation before the session

Background reading

|---|---|---|

**Reading after the lecture (optional)**


**Session 3: Data and Information in the Digital Age**

**Session 3: Data and Information in the Digital Age**

**Learning points of the session:**

- The power of data - enhancing business intelligence using IS
- Gaining competitive advantage with big data
- Ethical issues of data-based ways of working
- IT and organisational issues: decision making, power and control
Mandatory reading material and preparation before the session

### Background reading

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### Case study

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### Session 4: Business model innovation and industry transformation

#### Session 4: Business model innovation

**Learning points of the session:**

- Reviewing key frameworks for creating new business models
- Business model innovation
- Complementarities to business model innovation
- Emergence of new practices and impact for the industry

Mandatory reading material and preparation before the session

**Background reading**

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**Case study**

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Session 5: Knowledge and Innovation

**Session 5: Knowledge and innovation**

**Learning points of the session:**

- The role of knowledge in innovation
- Producing novelty across knowledge boundaries
- Cross-functional teams and complex collaboration
- Collaboration and innovation across organisational boundaries

Mandatory reading material and preparation before the session

**Background reading**

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<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Source</th>
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<tbody>
<tr>
<td>Carlile, P.</td>
<td>Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries</td>
<td>E-article via JSTOR</td>
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<tr>
<td>Dougherty, D. and Dunne, D. D.</td>
<td>Digital Science and Knowledge Boundaries in Complex Innovation.</td>
<td>E-article via Informs</td>
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<tr>
<td>Lee, J. and Berente, N.</td>
<td>Digital Innovation and the Division of Innovative Labor: Digital Controls in the Automotive Industry.</td>
<td>E-article via Informs</td>
</tr>
<tr>
<td>Catmull, E.</td>
<td>How Pixar Fosters Collective Creativity.</td>
<td>E-article via Business Complete [27]</td>
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Session 6: Digital Innovation and the changing nature of work and organising
Learning points of the session:

- IT and new ways of working and organizing
- Collaborating with IT
- Mobility and teleworking
- Virtual work

Mandatory reading material and preparation before the session

### Background reading

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Session 7: Open innovation

Learning points of the session:

- What is open innovation
- Crowdsourcing
- Citizen science
- Challenges in open collaboration

Mandatory reading material and preparation before the session

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<tr>
<td>Lakhani, K., Hutter, K., Pokrywa, H.S., Füller, J.</td>
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Reading after the lecture (optional)

Session 8: Student presentations

Learning points of the session:

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

Preparation before the session:

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

Send your slides to the lecturer and to your reviewer by Monday December 2\textsuperscript{nd} at 10:00.

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 papers before each session. These can be found in the course outline. There are four types of reading material:

- **Background reading** material is necessary for the students to follow the lecture and must be read in advance.

- **Case studies** are reports from studies on real cases performed and reported by scholars. All students are expected to have read the case studies in advance, in order to participate in class discussion.
Optional reading material can be read after each session and is expected to help the students in understanding the topic further, as well as in preparing their individual papers.

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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<tr>
<td>Final term paper</td>
<td>Individual</td>
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The individual paper assignment will include a 2,500-3,000 word paper on an agreed topic. Students will investigate and report on the effects of digital innovation in transforming a particular industry (e.g. digital goods in the entertainment sector, mobile applications in banking, etc.). Students are expected to apply the concepts discussed in the lectures. It is expected that students will, where appropriate, explicitly draw on the articles provided in the course as well as other relevant articles from their own research. The written work you submit for assessment needs to be grounded in the appropriate scholarly literature. Please, make sure that your work is carefully referenced in accordance with the Harvard system. More information is provided in a separate document and will be presented in the first session.

Learning objective:

- Reach a deeper understanding of the concepts and theories discussed in the class.
- Learn how to apply the theories and lessons learned from the class on an in-depth analysis of a specific phenomenon.
- Develop further analytical and writing skills.

Examination Guidelines

Please refer to Form & conduct of the examinations [40].

UK-SPEC

The UK Standard for Professional Engineering Competence (UK-SPEC) [41] 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 [42] which sets out the standard for degree accreditation.

The Output Standards Matrices [43] 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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**Source URL (modified on 19-05-20):** http://teaching.eng.cam.ac.uk/content/engineering-tripos-part-iib-4e3-business-innovation-digital-age-2019-20

**Links**

[1] mailto:sp805@cam.ac.uk
[2] https://idiscover.lib.cam.ac.uk/permalink/f/1kas1sp/TN_informaworld_s10_1080_19416520_2013_791066
[3] https://idiscover.lib.cam.ac.uk/permalink/f/1kas1sp/TN_proquest1505325909
[16] http://dx.doi.org/10.1016/j.jsis.2015.02.001
[18] http://dx.doi.org/10.1057/jit.2015.5
[26] http://dx.doi.org/10.1287/orsc.1110.0707
[27] http://search.ebscohost.com/login.aspx?direct=true&amp;db=bth&amp;bquery=(JN+%26quot%3bHarvard+Business+Review%26quot%3b+AND+DT+20080901)+AND+(AU+catmull)&amp;type=1&amp;site=ehost-live&amp;scope=site
[28] http://idiscover.lib.cam.ac.uk/permalink/f/1kas1sp/TN_informsorsc.1070.0307
[29] http://dx.doi.org/10.1287/orsc.1110.0703
[32] http://cam.summon.serialssolutions.com/2.0.0/link/0/elvHCXMw1V1NT9wwEB3RHIArVFpafHxIOfQaEcdOZIMhEF11VaS2hwoOPVIO4pRDuwusV4jI_7wzTpyqqFLhEsmeUaLEE_vZIn4DECtMbeGBRakyrKTMOIGTIssoG69K0PEk8m-RlzzsfxK_NvKxAYeODkJ0IMC_QY-Yaqnlz2QNEXSMj2-vEo4UxTvqPZpM6jbFYQ
[33] http://dx.doi.org/10.1287/orsc.1100.0573
[34] http://idiscover.lib.cam.ac.uk/permalink/f/1kas1sp/TN_proquest1319248323