Engineering Tripos Part IIB, 4E3: Information Systems, 2016-17

Module Leader
Stella Pachidi [1]

Lecturer
Stella Pachidi [1]

Timing and Structure
Michaelmas term. Assessment: Coursework / 1 Individual Paper 65% / 1 Individual Presentation & Review 10% / Group Case Study Analysis 25%

Aims
The aims of the course are to:

- Learn how information technology (IT) can change radically the way people work, the business processes of organisations and the industries in which they operate.
- Get acquainted with the practices and processes of innovating in the digital era.
- Reflect on the challenges that people and organisations face in the digital era, and 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 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

Syllabus
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: Wednesday 12 October, 15:00-17:00
- Introduction to Innovation in a Digital Age
- Structure: lecture and class discussion

Session 2: Wednesday 19 October, 15:00-17:00
- Digital Innovation: Platforms and Ecosystems
- Structure: lecture and class discussion

Session 3: Wednesday 26 October, 15:00-17:00
- Data and Information in the Digital Age
- Structure: lecture, group presentation and class discussion

Session 4: Wednesday 2 November, 15:00-17:00
- Business model innovation and industry transformation
- Structure: lecture, group presentation and class discussion

Session 5: Wednesday 9 November, 15:00-17:00
- Knowledge and Innovation
Session 1: Introduction to Innovation in a Digital Age

Learning points of the session:

- Introduction to different types of business innovation
- Disruptive innovation
- Discuss the shifting role of digital technology
- How digital technologies change the way companies innovate
- Get to know Business Information Systems
- Get a grip of how digital technologies change social and organisational life

Mandatory reading material and preparation before the session


**Case study**


**Reading after the lecture (optional)**


- Ch. 2 ‘Gaining competitive advantage through information systems’
- Ch. 4 ‘Enabling Business-to-Consumer Electronic Commerce’

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**Session 2: Digital Innovation: Platforms and Ecosystems**

**Session 2: Digital Innovation: Platforms and Ecosystems**

**Wednesday 19 October, 15:00-17:00**

**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**

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<th>Journal/Book Details</th>
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**Case study**

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**Reading after the lecture (optional)**

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

Wednesday 26 October, 15:00-17:00

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

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<tr>
<td>Ch. 6 ‘Enhancing Business Intelligence using Information Systems’</td>
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<tr>
<th>LaValle, S. et al. (2011)</th>
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Session 4: Business model innovation and industry transformation

Wednesday 2 November, 15:00-17:00

Learning points of the session:

- Business model innovation
- Emergence of new practices and impact for the industry
- Understand the relationship of digital innovation and industry transformation

Mandatory reading material and preparation before the session

Background reading

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Case study

<table>
<thead>
<tr>
<th>Hettich, E., and Müller-Stewens, G.</th>
<th>Tesla Motors Business Model Configuration 314-132-1</th>
<th>VLE</th>
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Reading after the lecture (optional)

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Session 5: Knowledge and Innovation

Wednesday 9 November, 15:00-17:00

Learning points of the session:

- Knowledge and organisation
- Cross-functional teams and complex collaboration
- Collaboration and innovation across organisational boundaries
- Open Innovation

Mandatory reading material and preparation before the session

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Reading after the lecture (optional)

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E-article via Business Complete [25]

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**Session 6: Digital Business Transformation: Guest Lecture by Yuval Dvir, Google**

**Wednesday 16 November, 15:00-17:00**

**Learning points of the session:**

- Understand how digital technologies can support business processes
- How digital technologies can help gain competitive advantage
- The relationship between digital technologies and organisational change
- Transforming organisations with digital technologies: Resistance and workarounds

**Mandatory reading material and preparation before the session**

**Background reading**


**Case study**

Reading after the lecture (optional)

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

Wednesday 23 November, 15:00-17:00

Learning points of the session:

- IT in the workplace
- New ways of organizing
- Collaborating with IT
- Mobility and teleworking
- Virtual work

Mandatory reading material and preparation before the session

Background reading

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### Case study

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### Session 8: Student Presentations

**Session 8: Student Presentations**

*Wednesday 30 November, 15:00-17:00*

**Learning points of the session:**

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

**Preparation before the session**
(a) Prepare the slides of your presentation and practice. Send your slides with notes below each slide to the lecturer and to your reviewer by 15:00pm on Monday November 28.

(b) Read the paper of your classmate and write constructive feedback (about 1/2 A4 page).

**During the session:**

Each individual presentation will be followed by the peer-review.

**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 3 means:

- **Written paper, individual** (65% of total mark). This component of the assessment is made up of a final term paper.
- **Presentation and peer review, individual** (10% of total mark). Presentation based on your individual paper and peer review.
- **Case study presentation and discussion, team** (25% of total mark). Presenting a case study (10%) and discussing another team’s presentation (5%) during one of the sessions 3-6. Participating in the virtual work project with presentation and discussion (10%) in session 7.

The individual paper assignment will include a 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. ([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...))
During the final lecture session, each student will give a short presentation of the main arguments of his/her individual paper, in order to receive feedback from one classmate. This presentation should be approximately 10 mins long with an additional 5 mins for questions. Also, each student will review the presentation of another student and prepare comments (about 1/2 A4 page) on the argumentation, to provide after the presentation of that paper. More information will be provided during the course.

The presentation and review will be assessed as part of the individual class participation mark. Individual class participation will also be assessed based on the student’s comments in class discussions and case study presentations.

Course participants will be assigned into groups once the overall class size has been finalised. Each student group will be assigned a case study which they will be required to read and think about prior to the class, and present their viewpoints and analysis to the class in sessions 3-6. Each member of the team must present to be eligible for grading. Only exceptions include exceptional circumstances such as illness covered by a doctor’s certificate.

Each team will also be assigned a turn to act as a ‘response’ group, leading the discussion and question time following a case presentation in sessions 3-6. This will be an assessed exercise and forms part of the class participation mark. Each member of the team should contribute to critiquing the case presentations. Once again, the only exceptions include exceptional circumstances such as illness covered by a doctor’s certificate.

Case study presentations should be 20-mins long and will be followed a 10-minute discussion session. Each presenting group should send the lecturer (s.pachidi@jbs.cam.ac.uk [1]) and the response group a copy of their case presentation (with notes below each slide) the day before their in-class presentation.

Finally, all students will participate in the virtual work project. This project is co-organised together with a class at VU University Amsterdam. Course members will collaborate virtually with students from Amsterdam, in order to analyse a case study and prepare a presentation of their analysis and viewpoints. The presentations will be discussed in session 7. It is mandatory for the students to be present in that session, to be eligible for grading. The team formation will be different from that for the other case studies. More details will be provided in a separate document in the start of the course.

**Assessment**

Please refer to Form & conduct of the examinations [36].

**UK-SPEC**

The UK Standard for Professional Engineering Competence (UK-SPEC) [37] 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 [38] which sets out the standard for degree accreditation.

The Output Standards Matrices [39] 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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