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

Module Leader

Stella Pachidi [1]

Lecturer

Stella Pachidi [2]

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 Ven, A. H. (2013).	Perspectives on innovation processes. *The Academy of Management Annals*, *7*(1), 775-819.	**E-article via Busine Complete** [3]
Lucas Jr, H. C. et al. (2013)	"Impactful Research on Transformational Information Technology: An Opportunity to Inform New Audiences." *MIS Quarterly*, 37(2): pp. 371-382	**E-article via Busine Complete** [4]

Reading after the lecture (optional)

Christensen, C. M., Raynor, M. and McDonald, R. (2015)	"What is Disruptive Innovation?" *Harvard Business Review,* 93(12): pp. 44-53	**E-article via Busine Complete** [5]
Wang, P. (2010)	"Chasing the Hottest IT: Effects of Information Technology Fashion on Organizations." *MIS Quarterly*, 34(1): pp. 63-85	**E-article via Busine Complete** [6]
Drucker, P. F. (1998)	"The Discipline of Innovation." *Harvard Business Review*, 76(6): pp. 149-157	**E-article via Busine Complete** [7]
Iansiti, M. and Lakhani, K. R. (2014)	"Digital Ubiquity: How Connections, Sensors, and Data Are Revolutionizing Business." *Harvard Business Review*, 92(11): pp. 90-99	**E-article via Busine Complete** [8]

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		
Yoo, Y., Henfridsson, O. and Lyytinen, K. (2010)	"Research Commentary - The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research." *Information Systems Research*, 21(4): pp. 724-735	**E-article via Busine Complete** [9]
Yoo, Y. et al. (2012)	"Organizing for Innovation in the Digitized World." *Organization Science*, 23(5): pp. 1398-1408	**E-article via Inform**

Reading after the lecture (optional)

Van Alstyne, M. W., Parker, G. G., & Choudary, S. P. (2016).	Pipelines, Platforms, and the New Rules of Strategy. Harvard Business Review, 94(4)	**E-article via Busine Complete** [11]
Ghazawneh, A. and Henfridsson, O. (2013)	"Balancing Platform Control and External Contribution in Third-Party Development: The Boundary Resources Model." *Information Systems Journal*, 23(2): pp. 173-192	**E-article via Busine Complete** [12]
Weill, P. and Woerner, S. L. (2015)	"Thriving in an Increasingly Digital Ecosystem." *MIT Sloan Management Review*, 56(4): pp. 27-34	**E-article via ABI Inf** [13]
Evans, D. S., Hagiu, A. and Schmalensee, R. (2006)	*Invisible Engines: How Software Platforms Drive Innovation and Transform Industries*. Cambridge, MA: MIT Press	**E-book via MIT Pre** **Printed book at: QA 2006**
Henfridsson, O., Mathiassen, L. and Svahn, F. (2014)	"Managing Technological Change in the Digital Age: The Role of Architectural Frames." *Journal of Information Technology*, 29(1): pp. 27-43	**E-article via ABI Inf** [15]

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		
Pachidi, S., & Huysman, M. (2017)	"Organizational intelligence in the digital age". In (Galliers, R., & Stein, M.-K.) The Routledge Companion to Management Information Systems.	**E-book via iDiscov** **Printed book**
Case study		
Applegate, L. M. et al. (2012)	*Bonnier: Digitalizing the Media Business*. Harvard Business School, 9-813-073	**VLE**

Reading after the lecture (optional)

Newell, S. and Marabelli, M. (2015)	"Strategic Opportunities (and Challenges) of Algorithmic Decision-Making: A Call for Action on the Long-Term Societal Effects of 'Datification'." *The Journal of Strategic Information Systems*, 24(1): pp. 3-14	**E-article via Scienc**
Valacich, J. and Schneider, C. (2015)	*Information Systems Today: Managing in the Digital World*. 7th ed. Boston: Pearson Ch. 6 'Enhancing Business Intelligence using Information Systems'	**Printed book at: T5**
LaValle, S. et al. (2011)	"Big Data, Analytics and the Path from Insights to Value." *MIT Sloan Management Review*, 52(2): pp. 21-32	**E-article via ABI Inf** [18]
Zuboff, S. (2015)	"Big Other: Surveillance Capitalism and the Prospects of an Information Civilization." *Journal of Information Technology*, 30(1): pp. 75-89	**E-article via Palgra**

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		
Teece, D. J. (2010)	"Business Models, Business Strategy and Innovation." *Long Range Planning,* 43(2-3): pp. 172-194	**E-article via Scienc**
Case study		
Thompson, M. (2015)	NHS Jobs: Using digital platforms to transform recruitment across the English & Welsh National Health Service Case 315-268-1	**VLE**

Reading after the lecture (optional)

Amit, R. and Zott, C. (2012)	"Creating Value Through Business Model Innovation." *MIT Sloan Management Review*, 53(3): pp. 41-49	**E-article via ABI Inf** [21]
Orlikowski, W. J. and Scott, S. V. (2013)	"What Happens When Evaluation Goes Online? Exploring Apparatuses of Valuation in the Travel Sector." *Organization Science*, 25(3): pp. 868-891	**E-article via Inform**
Barrett, M. et al. (2015)	"Service Innovation in the Digital Age: Key Contributions and Future Directions." *MIS Quarterly*, 39(1): pp. 135-154	**E-article via Busine Complete** [23]

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		
Carlile, P. (2004)	Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries	**E-article via JSTOR**
Case study		
Barrett, M., Kim, H.S.A.. & Prince, K.	M-PESA Power : Leveraging Service Innovation in Emerging Economies 911-007-1	**VLE**

Reading after the lecture (optional)

Brown, J. S. and Duguid, P. (2001)	"Knowledge and Organization: A Social-Practice Perspective." *Organization Science*, 12(2): pp. 198-213	**E-article via Busine Complete** [25]
Seely Brown, J. and Duguid. P. (2000)	*The Social Life of Information*. Boston: Harvard Business School Press Ch. 3	**Printed book at: HM**
Dougherty, D. and Dunne, D. D. (2012)	"Digital Science and Knowledge Boundaries in Complex Innovation." *Organization Science*, 23(5): pp.1467-1484	**E-article via Inform**
Lee, J. and Berente, N. (2012)	"Digital Innovation and the Division of Innovative Labor: Digital Controls in the Automotive Industry." *Organization Science,*23(5): pp. 1428-1447	**E-article via Inform**
Catmull, E. (2008)	"How Pixar Fosters Collective Creativity." *Harvard Business Review*, 86(9): pp. 64-72	**E-article via Busine Complete** [28]

Session 6: Digital Innovation and the changing nature of work and organising

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		
Zammuto, R. F. et al. (2007)	"Information Technology and the Changing Fabric of Organization." *Organization Science*, 18(5): pp. 749-762	**E-article via Busine Complete** [29]
Case study		
Pachidi, S. (2017)	"Introducing data analytics in TelCo Sales Medium"	**VLE**

Reading after the lecture (optional)

Bailey, D. E., Leonardi, P. M. and Barley, S. R. (2012)	"The Lure of the Virtual." *Organization Science*, 23(5): pp. 1485-1504	**E-article via Inform**
Barrett, M. et al. (2012)	"Reconfiguring Boundary Relations: Robotic Innovations in Pharmacy Work." *Organization Science*, 23(5): pp. 1448-1466	**E-article via Inform**
Boudreau, M-C. and Robey, D. (2005)	"Enacting Integrated Information Technology: A Human Agency Perspective." *Organization Science*, 16(1): pp. 3-18	**E-article via Busine Complete** [32]
Malhotra, A., Majchrzak, A., Carman, R., & Lott, V. (2001).	Radical innovation without collocation: A case study at Boeing-Rocketdyne. *MIS Quarterly*,25(2): pp. 229-249.	**E-article via JSTOR**
Barley, S. R., Meyerson, D. E. and Grodal, S. (2011)	"E-mail as a Source and Symbol of Stress."*Organization Science*, 22(4): pp. 887-906	**E-article via Inform**

Session 7: Open innovation

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

Background reading		
Boudreau, K. J., & Lakhani, K. R. (2013).	Using the Crowd as an Innovation Partner. Harvard Business Review, 91(4), 60-69.	**E-article via Busine Complete** [35]
Case study		
Lakhani, K. Hutter, K., Pokrywa, H.S., Füller, J.	Open Innovation at Siemens. 9-613-100	**VLE**

Reading after the lecture (optional)

Garud, R., Kumaraswamy, A., & Sambamurthy, V. (2006)	Emergent by design: Performance and transformation at Infosys Technologies. *Organization Science*, *17*(2), 277-286.	**E-article via JSTOR**
Afuah, A., & Tucci, C. L. (2012).	CROWDSOURCING AS A SOLUTION TO DISTANT SEARCH. Academy of Management Review, 37(3), 355-375	**E-article via Busine Complete** [37]

Hargadon A and Sutton RI. (1997).	Technology brokering and innovation in a product development firm. Administrative Science Quarterly 42: 716-749.	**E-article via ABI Inf** [38]
Jeppesen, L. B. and K. R. Lakhani (2010).	"Marginality and Problem-Solving Effectiveness in Broadcast Search." Organization Science 21(5): 1016-1033.	**E-article via JSTOR**

Session 8: Student presentations

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 2nd 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.

Coursework	Format	Due date & marks
Final term paper 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. (http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-a... [40]) 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.	Individual Report anonymously marked	Tuesday 16:00 (via [60/60]

Examination Guidelines

Please refer to Form & conduct of the examinations [41].

UK-SPEC

This syllabus contributes to the following areas of the UK-SPEC [42] standard:

Toggle display of UK-SPEC areas.

GT1

Develop transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT facilities and information retrieval skills. They also include planning self-learning and improving performance, as the foundation for lifelong learning/CPD.

IA1

Apply appropriate quantitative science and engineering tools to the analysis of problems.

IA2

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

KU1

Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of their engineering discipline, and its underpinning science and mathematics.

KU2

Have an appreciation of the wider multidisciplinary engineering context and its underlying principles.

S1

The ability to make general evaluations of commercial risks through some understanding of the basis of such risks.

P3

Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc).

US4

An awareness of developing technologies related to own specialisation.

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[10] http://dx.doi.org/10.1287/orsc.1120.0771
[11] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=113934414&site=ehost-live&scope=site
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[17] http://dx.doi.org/10.1016/j.jsis.2015.02.001
[18] http://search.proquest.com/docview/845235605?accountid=9851
[19] http://dx.doi.org/10.1057/jit.2015.5
[20] http://dx.doi.org/10.1016/j.lrp.2009.07.003
[21] http://search.proquest.com/docview/963962187?accountid=9851
[22] http://dx.doi.org/10.1287/orsc.2013.0877
[23] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=100717562&site=ehost-live&scope=site
[24] http://www.jstor.org/stable/pdf/30034757.pdf
[25] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=5159320&site=ehost-live&scope=site
[26] http://dx.doi.org/10.1287/orsc.1110.0700
[27] http://dx.doi.org/10.1287/orsc.1110.0707
[28] http://search.ebscohost.com/login.aspx?direct=true&db=bth&bquery=(JN+%26quot%3bHarvard+Business+Review%26quot%3b+AND+DT+20080901)+AND+(AU+catmull)&type=1&site=ehost-live&scope=site
[29] http://idiscover.lib.cam.ac.uk/permalink/f/1kas1sp/TN_informsorsc.1070.0307
[30] http://dx.doi.org/10.1287/orsc.1110.0703
[31] http://dx.doi.org/10.1287/orsc.1100.0639
[32] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=16285247&site=ehost-live&scope=site
[33] http://cam.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwlV1NT9wwEB3RHlArVFpaIHxIOfQaEcdOZlMhEF11VaS2hwoOPVlO4pRDuwusV4Ij_7wzTpyyqFLhEsmeUaLEE_vZfn4DECtMbeGBRakyrKTM0lGTIsoG69K0PEk8m-RfzssfX_NvKxAyODKj0lMC_QY-YaPqlz2QNESXMj2-vEo4UxTvqPZpM6jbFYQ
[34] http://dx.doi.org/10.1287/orsc.1100.0573
[35] http://idiscover.lib.cam.ac.uk/permalink/f/1kas1sp/TN_proquest1319248323
[36] http://tf5lu9ym5n.scholar.serialssolutions.com/?sid=google&auinit=R&aulast=Garud&atitle=Emergent+by+design:+Performance+and+transformation+at+Infosys+Technologies&id=doi:10.1287/orsc.1050.0179&title=Organization+science+(Providence,+R.I.)&volume=1
[37] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=76609307&site=ehost-live&scope=site
[38] http://search.proquest.com/docview/203973340?accountid=9851
[39] http://www.jstor.org/stable/40926725
[40] http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-all-you-need-to-know-in-one-place/
[41] http://teaching.eng.cam.ac.uk/content/form-conduct-examinations
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