Engineering Tripos Part IIB, 4E3: Business Innovation in a Digital Age, 2017-18

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:

- 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 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: Wednesday 11 October, 15:00-17:00

- · Introduction to Innovation in a Digital Age
- Structure: lecture and class discussion

Session 2: Wednesday 18 October, 15:00-17:00

- Digital Innovation: Platforms and Ecosystems
- · Structure: lecture and class discussion

Session 3: Wednesday 25 October, 15:00-17:00

- · Data and Information in the Digital Age
- · Structure: lecture, group presentation and class discussion

Session 4: Wednesday 1 November, 15:00-17:00

- Business model innovation and industry transformation
- Structure: lecture, group presentation and class discussion

Session 5: Wednesday 8 November, 15:00-17:00

Knowledge and Innovation

• Structure: lecture, group presentation and class discussion

Session 6: Wednesday 15 November, 15:00-17:00

- Digital Innovation and the changing nature of work and organising
- Structure: lecture, group presentation and class discussion

Session 7: Wednesday 22 November, 15:00-17:00

- · Digital transformations and open innovation
- · Structure: guest lecture, group presentation and class discussion

Session 8: Wednesday 29 November, 15:00-17:00

- · Student presentations
- Structure: Each individual presentation will be followed by a short discussion in the class.

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 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

Background reading

Garud, R., Tuertscher, P., & Van de Perspectives on innovation processes. The Academy of

E-article via <u>Taylor</u>

Ven, A. H. (2013).	Management Annals, 7(1), 775-819.	online [2]
	"Impactful Research on Transformational Information Technology: An Opportunity to Inform New Audiences." <i>MIS Quarterly</i> , 37(2): pp. 371-382	E-article via <u>Busine</u> Complete [3]

Reading after the lecture (optional)

Christensen, C. M., Raynor, M. and	"What is Disruptive Innovation?" <i>Harvard Business Review</i> , 93(12):	E-article via Busine
McDonald, R. (2015)	рр. 44-53	Complete [4]
Wang, P. (2010)	5 S)	E-article via <mark>Busine</mark>
	on Organizations." <i>MIS Quarterly</i> , 34(1): pp. 63-85	Complete [5]
Drucker, P. F. (1998)	"The Discipline of Innovation." Harvard Business Review, 76(6): pp.	E-article via <mark>Busine</mark>
	149-157	Complete [6]
lansiti, M. and Lakhani, K. R. (2014)	Digital Ubiquity: How Connections, Sensors, and Data Are	E-article via <mark>Busine</mark>
	Revolutionizing Business." <i>Harvard Business Review</i> , 92(11): pp. 90-99	Complete [7]

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)		E-article via <u>Busine</u> Complete [8]
Yoo, Y. et al. (2012)	"Organizing for Innovation in the Digitized World." <i>Organization Science</i> , 23(5): pp. 1398-1408	E-article via <u>Inform</u>

Reading after the lecture (optional)

	-	E-article via <u>Busin</u> Complete [10]
Weill, P. and Woerner, S. L. (2015)	'Thriving in an Increasingly Digital Ecosystem." <i>MIT Sloan</i> <i>Management Review</i> , 56(4): pp. 27-34	E-article via <mark>ABI In</mark> [11]
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 <u>MIT Pre</u>
		Printed book at: Q 2006
	"Managing Technological Change in the Digital Age: The Role of Architectural Frames." <i>Journal of Information Technology</i> , 29(1): pp. 27-43	E-article via <u>ABI In</u> [13]

Session 3: Data and Information in the Digital Age

Session 3: Data and Information in the Digital Age

- 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

Background reading		
	"Organizational intelligence in the digital age". In (Galliers, R., & Stein, MK.) The Routledge Companion to Management Information Systems. Forthcoming	
Case study		
	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"." <i>The Journal of Strategic Information Systems</i> , 24(1): pp. 3-14	E-article via <u>Scienc</u>
Valacich, J. and Schneider, C. (2015)	Information Systems Today: Managing in the Digital World. 7 th 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." <i>MIT Sloan</i> Management Review, 52(2): pp. 21-32	E-article via <u>ABI Inf</u> [15]
Zuboff, S. (2015)	"Big Other: Surveillance Capitalism and the Prospects of an Information Civilization." <i>Journal of Information Technology</i> , 30(1): pp. 75-89	E-article via <u>Palgra</u>

Session 4: Business model innovation and industry transformation

Session 4: Business model innovation and industry transformation

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

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

Reading after the lecture (optional)

Amit, R. and Zott, C. (2012)	[•] Creating Value Through Business Model Innovation." <i>MIT Sloan Management Review</i> , 53(3): pp. 41-49	E-article via <u>ABI Inf</u> [18]
Orlikowski, W. J. and Scott, S. V. (2013)	"What Happens When Evaluation Goes Online? Exploring Apparatuses of Valuation in the Travel Sector." <i>Organization</i> <i>Science</i> , 25(3): pp. 868-891	E-article via <u>Inform</u>
Barrett, M. et al. (2015)	"Service Innovation in the Digital Age: Key Contributions and Future Directions." <i>MIS Quarterly</i> , 39(1): pp. 135-154	E-article via <u>Busine</u> Complete [20]

Session 5: Knowledge and Innovation

Session 5: Knowledge and Innovation

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

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

Reading after the lecture (optional)

Brown, J. S. and Duguid, P. (2001)	5 5	E-article via <u>Busine</u> Complete [22]
Seely Brown, J. and Duguid. P. (2000)	<i>The Social Life of Information.</i> Boston: Harvard Business School Press Ch. 3	Printed book at: HN
Dougherty, D. and Dunne, D. D. (2012)	Digital Science and Knowledge Boundaries in Complex Innovation." <i>Organization Science</i> , 23(5): pp.1467-1484	E-article via <u>Inform</u>
Lee, J. and Berente, N. (2012)	"Digital Innovation and the Division of Innovative Labor: Digital Controls in the Automotive Industry." <i>Organization Science,</i> 23(5): pp. 1428-1447	E-article via <u>Inform</u>
Catmull, E. (2008)	"How Pixar Fosters Collective Creativity." <i>Harvard Business Review</i> , 86(9): pp. 64-72	E-article via <u>Busine</u> Complete [25]

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

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

Background reading		
Zammuto, R. F. et al. (2007)	"Information Technology and the Changing Fabric of Organization." <i>Organization Science</i> , 18(5): pp. 749-762	E-article via <u>Busine</u> Complete [26]
Case study	.	<u>.</u>
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." <i>Organization Science</i> , 23(5): pp. 1485-1504	E-article via <u>Inform</u>
Orlikowski, W. (1992)	Learning From Notes: Organizational Issues in Groupware Implementation. Sloan School of Business, MIT	E-paper via <u>MIT</u> [28
Boudreau, M-C. and Robey, D. (2005)	[•] Enacting Integrated Information Technology: A Human Agency Perspective." <i>Organization Science</i> , 16(1): pp. 3-18	E-article via <u>Busine</u> Complete [29]
Malhotra, A., Majchrzak, A., Carman, R., & Lott, V. (2001).	Radical innovation without collocation: A case study at Boeing- Rocketdyne. <i>MIS Quarterly</i> ,25(2): pp. 229-249.	E-article via <u>JSTOF</u>
Barley, S. R., Meyerson, D. E. and Grodal, S. (2011)	"E-mail as a Source and Symbol of Stress." <i>Organization Science</i> , 22(4): pp. 887-906	E-article via <u>Inform</u>

Session 7: Digital Business Transformation and Open Innovation: Guest Lecture

Session 7: Digital Business Transformation and Open Innovation: Guest Lecture

- 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

Background reading		
Garud, R., Kumaraswamy, A., & Sambamurthy, V. (2006)	Emergent by design: Performance and transformation at Infosys Technologies. <i>Organization Science</i> , <i>17</i> (2), 277-286.	E-article via <u>JSTOF</u>
Boudreau, K. J., & Lakhani, K. R. (2013).	Using the Crowd as an Innovation Partner. Harvard Business Review, 91(4), 60-69.	E-article via <u>Busine</u> Complete [33]
Case study		-
Lakhani, K. Hutter, K., Pokrywa, H.S., Füller, J.	Open Innovation at Siemens. 9-613-100	VLE

Reading after the lecture (optional)

	Pipelines, Platforms, and the New Rules of Strategy. Harvard Business Review, 94(4)	E-article via <u>Busine</u> Complete [34]
	CROWDSOURCING AS A SOLUTION TO DISTANT SEARCH. Academy of Management Review, 37(3), 355-375	E-article via <u>Busine</u> Complete [35]
	Technology brokering and innovation in a product development firm. Administrative Science Quarterly 42: 716-749.	E-article via <u>ABI Inf</u> [36]
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 <u>JSTOR</u>

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 (5min) and practise. Send your slides with notes below each slide to the lecturer by 10:00am on *Monday 27 November*.

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:

- <u>Background reading</u> material is necessary for the students to follow the lecture and must be read in advance.
- <u>Case studies</u> 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.

• <u>Optional reading material</u> 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 (60% of total mark). This component of the assessment is made up of a final term paper.
- Presentation, 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 (20%) and discussing another team's presentation (5%) during one of the sessions 3-7.

Coursework

Final term paper

The individual paper assignment will include a 3,000-word paper on an agreed topic. Students will investigate and report on the innovation in transforming a particular industry (e.g. digital goods in the entertainment sector, mobile applications in banking, expected to apply the concepts discussed in the lectures. It is expected that students will, where appropriate, explicitly draw of provided in the course as well as other relevant articles from their own research. The written work you submit for assessment grounded in the appropriate scholarly literature. Please, make sure that your work is carefully referenced in accordance with the system. (http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-a... [38]) More information is provided in a second will be presented in the first session.

_earning 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 apply the development of the specific phenomenon
- Develop further analytical and writing skills.

Presentation

During the final lecture session, each student will give a short presentation of the main arguments of his/her individual paper, feedback from the lecturer and classmates. This presentation should be approximately 5 mins long with an additional 5 mins f More information will be provided during the course.

_earning objective:

- Learn about digital transformations in various industries from your classmates' presentations.
- Receive feedback on your paper.
- Practice presentation skills.

Group case analysis

Course participants will be assigned into groups once the overall class size has been finalised. Each student group will be as study which they will be required to read and think about prior to the class, and present their viewpoints and analysis to the cl 3-7. Each member of the team must present to be eligible for grading. Only exceptions include exceptional circumstances suc covered by a doctor's certificate.

Case study presentations should be 10-mins long and will be followed by a 5-minutes critique by the response group. Each p should send the lecturer (<u>s.pachidi@jbs.cam.ac.uk</u> [1]) and the response group a copy of their case presentation (with notes l the day before their in-class presentation.

Learning objective:

- Apply the theories learned to a real case.
- Develop analytical skills.
- Practice presentation skills.

Group case discussion

Each team will also be assigned a turn to act as a 'response' group, leading the discussion and question time following a case sessions 3-7. This will be an assessed exercise and forms part of the class participation mark. Each member of the team sho critiquing the case presentations. Once again, the only exceptions include exceptional circumstances such as illness covered certificate.

Learning objective:

- Apply the theories learned to a real case.
- Develop analytical and reviewing skills.
- Practice presentation skills.

Examination Guidelines

Please refer to Form & conduct of the examinations [39].

UK-SPEC

This syllabus contributes to the following areas of the <u>UK-SPEC</u> [40] 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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Links

[1] mailto:s.pachidi@jbs.cam.ac.uk

[2] http://idiscover.lib.cam.ac.uk/primo-explore/fulldisplay?docid=TN_tayfranc10.1080/19416520.2013.791066&am p;context=PC&vid=44CAM_PROD&search_scope=default_scope&tab=default_tab&lang=en_ US [3] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=87369991&site=ehostlive&:scope=site [4] http://search.ebscohost.com/login.aspx?direct=true&db=bth&bguery=(JN+%26quot%3bHarvard+Busi ness+Review%26quot%3b+AND+DT+20151201)+AND+(AU+christensen)&type=1&site=ehostlive&scope=site [5] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=48478373&site=ehostlive&scope=site [6] http://search.ebscohost.com/login.aspx?direct=true&db=bth&bguery=(JN+%26guot%3bHarvard+Busi ness+Review%26quot%3b+AND+DT+19981101)+AND+(AU+drucker)&type=1&site=ehostlive&scope=site [7] http://search.ebscohost.com/login.aspx?direct=true&db=bth&bguery=(JN+%26quot%3bHarvard+Busi ness+Review%26quot%3b+AND+DT+20141101)+AND+(AU+lakhani)&type=1&site=ehostlive&scope=site [8] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=57155474&site=ehostlive&scope=site [9] http://dx.doi.org/10.1287/orsc.1120.0771 [10] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=85102782&site=ehostlive&scope=site [11] http://search.proguest.com/docview/1694712973?accountid=9851 [12] https://mitpress.mit.edu/index.php?q=books/invisible-engines [13] http://search.proquest.com/docview/1497304558?accountid=9851 [14] http://dx.doi.org/10.1016/j.jsis.2015.02.001 [15] http://search.proguest.com/docview/845235605?accountid=9851 [16] http://dx.doi.org/10.1057/jit.2015.5 [17] http://dx.doi.org/10.1016/j.lrp.2009.07.003 [18] http://search.proquest.com/docview/963962187?accountid=9851 [19] http://dx.doi.org/10.1287/orsc.2013.0877 [20] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=100717562&site=ehostlive&scope=site [21] http://www.jstor.org/stable/pdf/30034757.pdf [22] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=5159320&site=ehostlive&scope=site [23] http://dx.doi.org/10.1287/orsc.1110.0700 [24] http://dx.doi.org/10.1287/orsc.1110.0707 [25] http://search.ebscohost.com/login.aspx?direct=true&db=bth&bquery=(JN+%26quot%3bHarvard+Bus iness+Review%26quot%3b+AND+DT+20080901)+AND+(AU+catmull)&type=1&site=ehostlive&scope=site [26] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=27156594&site=ehostlive&scope=site [27] http://dx.doi.org/10.1287/orsc.1110.0703 [28] http://ccs.mit.edu/papers/CCSWP134.html [29] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=16285247&site=ehostlive&:scope=site [30] http://cam.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwIV1NT9wwEB3RHIArVFpaIHxIOfQaEcdOZIMh EF11VaS2hwoOPVIO4pRDuwusV4lj 7wzTpyvgFLhEsmeUaLEE vZfn4DECtMbeGBRakyrKTM0IGTIsoG69K0PEk 8m-RfzssfX_NvKxAyODKj0IMC_QY-YaPqlz2QNESXMj2-vEo4UxTvqPZpM6jbFYQ [31] http://dx.doi.org/10.1287/orsc.1100.0573 [32] http://tf5lu9ym5n.scholar.serialssolutions.com/?sid=google&auinit=R&aulast=Garud&atitle=Eme rgent+by+design:+Performance+and+transformation+at+Infosys+Technologies&id=doi:10.1287/orsc.1050.01 79&title=Organization+science+(Providence,+R.I.)&volume=1 [33] http://idiscover.lib.cam.ac.uk/primo-explore/fulldisplay?docid=TN proquest1319248323&context=PC&am p;vid=44CAM_PROD&search_scope=default_scope&tab=default_tab&lang=en_US [34] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=113934414&site=ehost-

live&scope=site

[35] http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=76609307&site=ehost-live&scope=site

[36] http://search.proquest.com/docview/203973340?accountid=9851

[37] http://www.jstor.org/stable/40926725

[38] http://www.blogs.jbs.cam.ac.uk/infolib/2013/10/04/advice-on-plagiarism-all-you-need-to-know-in-one-place/

[39] https://teaching.eng.cam.ac.uk/content/form-conduct-examinations

[40] https://teaching.eng.cam.ac.uk/content/uk-spec