

# **TIMG 5003**

## **Issues in Technology Innovation Management**

**[0.5 credit]**

**Winter 2026**

**Institute of Technology Entrepreneurship and Commercialization**

**TIME AND PLACE:**

January 5 to April 8, 2026, Wednesdays, 6:05-8:55 pm Eastern time (Ottawa time)

In person: Nicol Building, NI 4010

Online (synchronous portion): Zoom <https://carleton-ca.zoom.us/j/92678019565>

**DELIVERY MODE:**

HyFlex: students can attend in-person, online or a combination of in-person and online. All course participants must use CU credentials and CU email accounts for communications and login. Students should engage in class regardless of in-person or online attendance.

**INSTRUCTOR:**

Mika Westerlund, [mika.westerlund@carleton.ca](mailto:mika.westerlund@carleton.ca)

Office: Nicol Building 5029

Office hours: Email is the preferred mode of communication because there is a record of content exchanged. The instructor will be available after class and by appointment depending on availability. Please email the instructor to schedule an on-campus or virtual appointment.

**COURSE MATERIALS:**

Access to online course sessions, course materials, list of readings and recorded videos will be provided through the CU Brightspace system: <https://carleton.ca/brightspace/>.

To access Brightspace and course materials you should use your CU credentials and select the TIMG 5003 Issues in Tech Innovation Management.

A required textbook is not assigned for this course. Readings (articles) can be accessed and downloaded through the CU Library Online service using student's CU access privilege. Each lecture is accompanied by 3-4 articles. You are required to read at least two of these, selecting the ones that interest you most.

Please note there can be changes to the material during the course. An up-to-date list of course readings will be available through the course site within Brightspace.

Lecture slides will be available on the course site on the day of each lecture.

### **COURSE DESCRIPTION:**

Calendar description: Key readings relevant to technology innovation management. Topics include the introduction of new products to the global market, technology sourcing, intellectual property rights, industry trends, technology and ethics, new business opportunities and product identification, industry characteristics, regulation, international competition, ecosystems, economic development, and open source.

Please note that some topics covered in the course may vary from the calendar description.

### **OBJECTIVES AND LEARNING OUTCOMES:**

The objective is to study essentials of technology innovation management through recent scholarly literature and case studies. Students will learn to create opportunities around technology innovation.

The specific objectives are to:

- Examine the elements that affect technology ventures' innovation and its management.
- Understand how small and large technology companies apply these innovation principles.
- Learn to recognize, analyze, create, and communicate technology innovation opportunities.

Upon course completion, participants will be able to:

- Synthesize learnings to manage the complexity of technology innovation management.
- Apply entrepreneurial ways to solve relevant technology innovation management problems.
- Prepare and present technology innovation opportunities that can have impact on society.

### **CLASS SESSIONS:**

Class sessions will include a combination of online lectures and interactive discussions. For each class, read the assigned articles and be prepared to:

- Present or discuss key points in the assigned course material.
- Apply learnings to real problems in organizations and society.
- Generate actionable insights and capture lessons learned.

Video recordings of class sessions will be available on the day after lecture within Brightspace.

## **ADMINISTRATIVE DETAILS:**

### **Missing classes**

If a student misses a class, it is the student's responsibility to find out what was covered, what assignments were made and what handouts were distributed. It is strongly recommended to watch the video recording of each missed class.

### **Plagiarism**

Plagiarism is a serious instructional offense that will not be tolerated. A case of plagiarism in assignments or the take-home final exam will be referred to the Chair of the Department and the Carleton University Ethics Committee. The instructor will not deal with the matter directly. See: <http://carleton.ca/registrar/academic-integrity/>

### **Course grading**

Marks will be assigned as follows:

<b>Course requirement</b>	<b>Mark (max.)</b>
8 x Assignment (individual effort), 5 pts for each completed assignment	40
1 x Take-home final exam (individual effort), max. 30 pts for each question	60
<b>Total (max.)</b>	<b>100</b>

Each completed assignment (a total of 8 assignments), submitted through Brightspace by the deadline, is worth 5 points, for a maximum total of 40 points per student. All assignments are mandatory to pass the course. See below for details on the assignments and their deadlines.

The take-home final exam will be graded on a competitive basis. The best solution(s) to each of the two questions will receive 30 points. All other solutions will be graded first in comparison to the top solution(s) and then in comparison to other students' solutions to determine the appropriate "grade basket." Assessment will emphasize originality, novelty, relevance, and depth of the solution, as well as the quality of writing and compliance with the guidelines provided. The maximum score any student can receive is 60 points, with a maximum of 30 points per question. See below for details.

In accordance with the Carleton University Graduate Grading System, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100 | A = 85-89 | A- = 80-84 | B+ = 77-79 | B = 73-76 | B- = 70-72 | F = Fail

The minimum passing grade for the course is B-.

Grades entered by Registrar: WDN = Withdrawn from the course | DEF = Deferred

### **ASSIGNMENTS:**

The student must successfully complete 8 mandatory assignments. Each assignment is valued at 5 points, for a maximum total of 40 points ( $8 \times 5$  points = 40 points). The instructor will personally mark all assignments and exams. Late assignments will not be accepted without prior permission from the instructor. Assignments must be completed individually; any group effort will be considered an act of plagiarism. Assignments should be submitted in PDF format through the course site on Brightspace by the specified deadline.

Details and instructions for the assignments will be provided and discussed in class. This information will also be available on the course site in Brightspace. Each assignment is based on the topic covered in its respective lecture, and your solution should be 1–2 pages long. Students are encouraged to connect their solutions to the lecture(s) whenever applicable by referencing course materials, including articles and lecture slides.

Deadlines for the assignments:

Assignment	Deadline
#1: Opportunity discovery through business model profiling	Mon Jan 26
#2: Increasing user's role in e-bike product development	Mon Feb 2
#3: Digital innovation in mental health services	Mon Feb 9
#4: Ethical issues in thermal camera technology use	Mon Feb 23
#5: Analyzing online reviews to understand technology adoption	Mon Mar 9
#6: Assessing feasibility of creative space innovations	Mon Mar 16
#7: Knowledge issues in virtual development teams	Mon Mar 23
#8: ChatGPT analysis of practitioner's view on ecosystems	Mon Mar 30

### **TAKE-HOME FINAL EXAM:**

The take-home final exam is an individual effort; any group collaboration will be considered an act of plagiarism. The examination questions, along with instructions and guidelines, will be discussed in class and distributed through the course site on Brightspace during Session 12 on April 1.

Your examination report, including the solutions, is **due on Thursday, April 23, 2026**, and must be submitted in PDF format through the course site on Brightspace by the deadline. Late submissions will not be accepted without prior permission from the instructor.

The final take-home exam consists of two questions, both designed to assess your ability to apply course learnings to solve real-life problems. The maximum length of the exam report is 8 pages for the two answers combined, plus an additional 1–2 pages for references, formatted with 1.5 line spacing. Use Times New Roman or Arial font with a size of 10 points or larger. Margins must be at least one inch on all sides.

In your solutions, cite course readings and materials, and include a list of references. The use of additional, non-course materials is encouraged, provided they are properly cited and referenced. The take-home final exam will be graded in comparison to other students' reports. See above for the assessment criteria.

### **CHATGPT:**

Students are encouraged to use ChatGPT (<https://chat.openai.com/chat>) to:

- Improve the flow and content of your assignments and essays.
- Align parts of an assignment to make a whole.
- Acquire and synthesize information.
- Create notes and learning diaries of the course content.
- Eliminate errors in grammar, spelling, and capitalization as well as citations and references.
- Provide a skeletal structure for assignments.
- Generate ideas, make recommendations, and extract what is most important.

Students are discouraged to use ChatGPT to:

- Provide unedited AI-generated output as a solution to assignments and exam questions.
- Produce content for assignments without double-checking citations and references.

### **CLASS SCHEDULE:**

This calendar is tentative; it may be modified as the course proceeds. Please consult the course site within Brightspace for up-to-date information on the course schedule and readings.

<b>Session</b>	<b>Date</b>	<b>Readings (see instructions)</b>	<b>Details / Other</b>
<i>Welcome to 5003</i>			
#01	Jan 7	• N/A	• Course outline
<i>Innovation &amp; prediction</i>			
#02	Jan 14	• N/A	• N/A
<i>Business models</i>			
#03	Jan 21	• Aspara et al. (2013)	• Delivery of assignment 1

		<ul style="list-style-type: none"> <li>• Desyllas &amp; Sako (2013)</li> <li>• Dunford et al. (2010)</li> <li>• Baden-Fuller &amp; Haefliger (2013)</li> </ul>	(deadline Jan 26)
<i>Users &amp; openness</i>			
#04	Jan 28	<ul style="list-style-type: none"> <li>• Anderson &amp; Wouters (2013)</li> <li>• Hienerth et al. (2014)</li> <li>• Stockstrom et al. (2016)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 2 (deadline Feb 2)</li> </ul>
<i>Digitalization</i>			
#05	Feb 4	<ul style="list-style-type: none"> <li>• Bican et al. (2020)</li> <li>• Bharadwaj et al. (2013)</li> <li>• Ross et al. (2019)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 3 (deadline Feb 9)</li> </ul>
<i>Ethics &amp; technology</i>			
#06	Feb 11	<ul style="list-style-type: none"> <li>• Neubert &amp; Montanez (2020)</li> <li>• Royakkers et al. (2018)</li> <li>• Stahl et al. (2017)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 4 (deadline Feb 23)</li> </ul>
<i>*Winter break – No classes*</i>			
	(Feb 18)	<ul style="list-style-type: none"> <li>• No classes</li> </ul>	<ul style="list-style-type: none"> <li>• No classes</li> </ul>
<i>Intellectual property rights</i>			
#07	Feb 25	<ul style="list-style-type: none"> <li>• Chen et al. (2023)</li> <li>• Fernandez (2009)</li> </ul>	<ul style="list-style-type: none"> <li>• Guest speaker (Derek Smith)</li> <li>• Note: date / readings TBC – please check course website in Brightspace for updates</li> </ul>
<i>Innovation adoption</i>			
#08	Mar 4	<ul style="list-style-type: none"> <li>• Venkatesh et al. (2012)</li> <li>• Sohn et al. (2024)</li> <li>• Chen et al. (2018)</li> <li>• Joachim et al. (2018)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 5 (deadline Mar 9)</li> </ul>
<i>Creativity &amp; innovativeness</i>			
#09	Mar 11	<ul style="list-style-type: none"> <li>• Gassman et al. (2010)</li> <li>• Mountz (2012)</li> <li>• Wu et al. (2024)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 6 (deadline Mar 16)</li> </ul>
<i>Knowledge creation</i>			
#10	Mar 18	<ul style="list-style-type: none"> <li>• Kauppila et al. (2011)</li> <li>• Mahr &amp; Lievens (2012)</li> <li>• Vaccaro et al. (2009)</li> </ul>	<ul style="list-style-type: none"> <li>• Tips for the final exam</li> <li>• Delivery of assignment 7 (deadline Mar 23)</li> </ul>
<i>Networks &amp; ecosystems</i>			
#11	Mar 25	<ul style="list-style-type: none"> <li>• Cummings &amp; Holmberg (2012)</li> <li>• Partanen &amp; Möller (2012)</li> <li>• Jacobides (2022)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 8 (deadline Mar 30)</li> </ul>
<i>Service innovation</i>			
#12	Apr 1	<ul style="list-style-type: none"> <li>• Woorder &amp; Baker (2012)</li> <li>• Heinonen &amp; Strandvik (2020)</li> <li>• Korper et al. (2020)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of the take home final exam (deadline Apr 23)</li> </ul>

## **COURSE SHARING WEBSITES:**

Materials created for this course (including presentations, slides, case studies, assignments, and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

## **REQUESTS FOR ACADEMIC ACCOMMODATION:**

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

### **Academic accommodations for students with disabilities**

Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation or a Letter of Accommodation at the beginning of the term. You must also contact the PMC ([carleton.ca/pmc/](http://carleton.ca/pmc/)) no later than two weeks before the assignment or exam requiring accommodation. After requesting accommodation from PMC, meet with your instructor to ensure accommodation arrangements are made.

### **Pregnancy obligation**

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

### **Religious obligation**

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](http://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

### **Survivors of Sexual Violence**

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: [carleton.ca/sexual-violence-support](http://carleton.ca/sexual-violence-support)

## **Other accommodation**

For information on other academic accommodation please contact the departmental administrator [timprogram@CUNET.Carleton.ca](mailto:timprogram@CUNET.Carleton.ca) or visit: <https://students.carleton.ca/course-outline/>

### **READINGS:**

The following is a preliminary list of course articles and may change as the course progresses. An up-to-date list of readings is available on the course site within Brightspace. To access the required journal articles in electronic format, click the DOI or PERMALINK hyperlinks for each article listed on the course site or go to CU Library's website (<https://library.carleton.ca/>). Log in using your CU credentials and use the library's search engine to access and download the article(s).

Each lecture is accompanied by 3-4 articles. You are required to read at least two of these, selecting the ones that interest you most.

#### **Readings for Session 1 – Welcome to TIMG 5003:**

- N/A

#### **Readings for Session 2 – Innovation & prediction:**

- N/A

#### **Readings for Session 3 – Business models:**

*Two of the following articles:*

- Aspara, J., Lamberg, J.-A., Laukia, A., & Tikkanen, H. (2013). Corporate Business Model Transformation and Inter-Organizational Cognition: The Case of Nokia. *Long Range Planning*, 46: 459–474.
- Desyllas, P. & Sako, M. (2013). Profiting from business model innovation: Evidence from Pay-As-You-Drive auto insurance. *Research Policy*, 42: 101–116.
- Dunford, R., Palmer, I. & Benveniste, J. (2010). Business Model Replication for Early and Rapid Internationalisation - The ING Direct Experience. *Long Range Planning*, 43: 655-674.

*Additional readings – Optional but recommended if you are unfamiliar with BMs:*

- Baden-Fuller, C. & Haefliger, S. (2013). Business Models and Technological Innovation. *Long Range Planning*, 46: 419–426.

#### **Readings for Session 4 – Users and openness:**

*Two of the following articles:*

- Anderson, J.C., & Wouters, M. (2013). What You Can Learn From Your Customer's Customer. *MIT Sloan Management Review*, 54(2): 75-82.
- Hienerth, C., Lettl, C., & Keinz, P. (2014). Synergies among Producer Firms, Lead Users, and User Communities: The Case of the LEGO Producer–User Ecosystem. *Journal of Product Innovation Management*, 31(4): 848-866.
- Stockstrom, C.S., Goduscheit, R.C., Lüthje, C., & Jørgensen, J.H. (2016). Identifying valuable users as informants for innovation processes: Comparing the search efficiency of pyramiding and screening. *Research Policy*, 45(2): 507-516.

### **Readings for Session 5 – Digitalization:**

*Two of the following articles:*

- Bican, P.M., & Brem, A. 2020. Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable “Digital”? *Sustainability*, 12(13): 5239.
- Bharadwaj, A., El Sawy, O.A., Pavlou, P.A., & Venkatraman, N. 2013. Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly*, 37(2): 471-482.
- Ross, J.W, Beath, C.M., & Mocker, M. 2019. Creating Digital Offerings Customers Will Buy. *MIT Sloan Management Review*, 61(1): 64-69.

### **Readings for Session 6 – Ethics & technology:**

*Two of the following articles:*

- Neubert, M.J., & Montanez, G.D. 2020. Virtue as a framework for the design and use of artificial intelligence. *Business Horizons*, 63(2): 195-204.
- Royakkers, L., Timmer, J., Kool, L., & van Est, R. 2018. Societal and ethical issues of digitization. *Ethics and Information Technology*, 20(2): 127–142.
- Stahl, B.S., Timmermans, J., & Flick, C. 2017. Ethics of Emerging Information and Communication Technologies. *Science and Public Policy*, Oxford University Press, 44(3): 369-381.

### **Readings for Session 7 – Intellectual property rights**

*Note: Guest lecturer / the articles may change – please check course website for updates*

*Two of the following articles:*

- Chen, F., Hou, Y., Qiu, J., & Richardson, G. (2023). Chilling effects of patent trolls. *Research Policy*, 52(3), 104702.
- Fernandez, D.S. (2009). Telematic method and apparatus with integrated power source. US Patent No. 7,575,080 B2, August 18, 2009. Available at <https://patents.google.com/patent/US7575080>

## **Readings for Session 8 – Innovation adoption:**

*Two of the following articles:*

- Venkatesh, V., Thong, J.Y.L., and Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36(1): 157-178.
- Sohn, E., Seamans, R., and Sands, D.B. (2024). Technology Adoption and Innovation: The Establishment of Airmail and Aviation Innovation in the United States, 1918–1935. *Strategic Management Journal*, 45(1): 3–35.
- Chen, H.-S., Tsai, B.-K., & Hsieh, C.-M. (2018). The Effects of Perceived Barriers on Innovation Resistance of Hydrogen-Electric Motorcycles. *Sustainability*, 10(6), 1933.
- Joachim, V., Spieth, P., and Heidenreich, S. (2018). Active innovation resistance: An empirical study on functional and psychological barriers to innovation adoption in different contexts. *Industrial Marketing Management*, 71(Complete), 95–107.

## **Readings for Session 9 – Creativity & innovativeness:**

*Two of the following articles:*

- Gassmann, O., Zeschky, M., Wolff, T. & Stahl, M. (2010). Crossing the Industry-Line: Breakthrough Innovation through Cross-Industry Alliances with ‘Non-Suppliers’. *Long Range Planning*, 43: 639-654.
- Mountz, M. (2012). Kiva the Disrupter. *Harvard Business Review*, December: 74-80.
- Wu, F.-S., Tsai, C.-C., Wu, C.-H., & Lo, T.-H. (2024). An exploratory study of breakthrough innovations in digital businesses: The case of the Perfect Corporation. *Technological Forecasting and Social Change*, 201(Complete), 123233.

## **Readings for Session 10 – Knowledge creation:**

*Two of the following articles:*

- Kauppila, O-P., Rajala, R. & Jyrämä, A. (2011). Knowledge sharing through virtual teams across borders and boundaries. *Management Learning*, 42(4): 395–418.
- Mahr, D. & Lievens, A. (2012). Virtual lead user communities: Drivers of knowledge creation for innovation. *Research Policy*, 41: 167–177.
- Vaccaro, A. Veloso, F. & Brusoni, S. (2009). The impact of virtual technologies on knowledge-based processes: An empirical study. *Research Policy*, 38: 1278–1287.

## **Readings for Session 11 – Networks & ecosystems:**

*Two of the following articles:*

- Cummings, J.L., & Holmberg, S.R. (2012). Best-fit Alliance Partners: The Use of Critical Success Factors in a Comprehensive Partner Selection Process. *Long Range Planning*, 45: 136–159.

- Partanen, J., & Möller, K. (2012). How to build a strategic network: A practitioner-oriented process model for the ICT sector. *Industrial Marketing Management*, 41: 481–494.
- Jacobides, M.G. (2022). How to Compete When Industries Digitize and Collide: An Ecosystem Development Framework. *California Management Review*, 64(3): 99-123.

**Readings for Session 12 – Service innovation:**

*Two of the following articles:*

- Woorder, S. & Baker, S. (2012). Extracting Key Lessons in Service Innovation. *Journal of Product Innovation Management*, 29(1): 13–20.
- Heinonen, K. & Strandvik, T. (2020). Reframing service innovation: COVID-19 as a catalyst for imposed service innovation. *Journal of Service Management*, 32(1): 101–112.
- Korper, A.K., Patrício, L., Holmlid, S., and Witell, L. (2020). Service Design as an Innovation Approach in Technology Startups: A Longitudinal Multiple Case Study. *Creativity and Innovation Management* 29(2): 303–323.