



**Carleton**  
University

**Sprett**  
School of Business



**Technology Innovation  
Management**



# **TIMG 5003**

## **Issues in Technology Innovation Management**

**[0.5 credit]**

**Fall 2024**

**Institute of Technology Entrepreneurship and Commercialization**

### **TIME AND PLACE:**

Sep 4 to Dec 6, 2024, Fridays, 2:35-5:25 pm Eastern time (Ottawa time)

In person: Nicol Building 4050

Online (synchronous portion): Zoom link available on TIMG 5003 course site within Brightspace.

### **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.

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 5003A 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 within 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 on the course may be different 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 equals to 5 points, thereby totaling max. 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, firstly, in comparison with the top solution(s) and, secondly, in comparison with other students’ solutions to find the correct “grade basket”. Assessment will emphasize originality, novelty, relevance, and depth of the solution, as well as quality and compliance with the provided guidelines. The maximum points any one student can receive is 60 points, a maximum of 30 points for each 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 of the 8 assignments is valued at 5 points (8 x 5 pts = max. 40 points). The instructor will mark all assignments and exams himself. Late assignments are not acceptable without permission from the instructor. Assignments are individual efforts only and group effort is considered an act of plagiarism. Assignments should be submitted in PDF format through the course site within Brightspace by the deadline.

Details and instructions regarding the assignments will be delivered and discussed in class. This information will also be available on the course site within Brightspace. Each assignment covers one lecture, and your solution should be 1-2 pages. Students should connect their solution to lecture(s) whenever applicable by using references to course material, including articles and lecture slides.

Deadlines for the assignments:

<b>Assignment</b>	<b>Deadline</b>
#1: Opportunity discovery through business model profiling	Wed Sep 25
#2: Increasing user's role in e-bike product development	Wed Oct 2
#3: Digital innovation in mental health services	Wed Oct 9
#4: Ethical issues in thermal camera technology use	Wed Oct 16
#5: Analyzing online reviews to understand technology adoption	Wed Oct 30
#6: Assessing feasibility of creative space innovations	Wed Nov 13
#7: Knowledge issues in virtual development teams	Wed Nov 20
#8: ChatGPT analysis of practitioner's view on ecosystems	Wed Nov 27

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

Take-home final exam is an individual effort, and group effort is considered an act of plagiarism. The examination questions along with detailed instructions and guidelines will be discussed in class and distributed through the course site within Brightspace during Session 12 on November 29.

Your examination report with the solutions is **due on Saturday December 21, 2024**, and it must be submitted in PDF format through the course site within Brightspace by the deadline. Late submission is not acceptable without permission from the instructor.

There are two questions in the final take-home exam. Both questions measure your ability to apply learnings from the course to solve a real-life problem. The maximum length of the take-home final exam report is 8 pages for the total of two answers and 1-2 pages for references, using 1.5 line spacing. Font type: Times New Roman or Arial. Font size measured in points (pts) must be 10 pts or higher. Use margins of one inch (minimum) all around. Cite course readings and material in the solutions and provide the list of references. The use of additional, non-course material is encouraged given that such material is cited, and references are provided. The take-home final exam will be marked based on a comparison with other students' reports. See above for 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.

Session	Date	Readings (see instructions)	Details / Other
<i>Welcome to 5003</i>			
#01	Sep 6	• N/A	• Course outline
<i>Innovation &amp; prediction</i>			
#02	Sep 13	• N/A	• N/A
<i>Business models</i>			
#03	Sep 20	• Aspara et al. (2013) • Desyllas & Sako (2013) • Dunford et al. (2010)	• Delivery of assignment 1 (deadline Sep 25)

		<ul style="list-style-type: none"> <li>• Baden-Fuller &amp; Haefliger (2013)</li> </ul>	
<i>Users &amp; openness</i>			
#04	Sep 27	<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 Oct 2)</li> </ul>
<i>Digitalization</i>			
#05	Oct 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 Oct 9)</li> </ul>
<i>Ethics &amp; technology</i>			
#06	Oct 11	<ul style="list-style-type: none"> <li>• Neubert &amp; Montanez (2020)</li> <li>• Royackers et al. (2018)</li> <li>• Stahl et al. (2017)</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of assignment 4 (deadline Oct 16)</li> </ul>
<i>Innovation adoption</i>			
#07	Oct 18	<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 Oct 30)</li> </ul>
<i>*Fall break – No classes*</i>			
	Oct 25	<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>			
#08	Nov 1	<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 / TBC – please check course website in Brightspace for updates</li> </ul>
<i>Creativity &amp; innovativeness</i>			
#09	Nov 8	<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 Nov 13)</li> </ul>
<i>Knowledge creation</i>			
#10	Nov 15	<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>• Delivery of assignment 7 (deadline Nov 20)</li> </ul>
<i>Networks &amp; ecosystems</i>			
#11	Nov 22	<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 Nov 27)</li> </ul>
<i>Service innovation</i>			
#12	Nov 29	<ul style="list-style-type: none"> <li>• Wooder &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 December 21)</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 its 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 – 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 8 – 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 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:*

- Wooder, 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.