TTMG 5101
INTEGRATED PRODUCT DEVELOPMENT

Summer 2008
Department of Systems and Computer Engineering
Carleton University

Professor Weiss
527 Architecture Annex (AA)
weiss@sce.carleton.ca

Instructor availability
The instructor is available via e-mail any time. Office hours by appointment (online/offline).

Calendar description
TTMG 5101 [0.5 credit] Integrated Product Development
The new product introduction process and time-based competition, basic concepts of integrated product development (concurrent engineering), the voice of the customer, quality function deployment, cross-functional teams, integrating information systems and technical tools, organizational support, manufacturing and design, cost estimation, implementation problems.
Prerequisite: TTMG 5001 and TTMG 5002

Course objectives
The objective of TTMG 5101 Integrated Product Development is to examine how to profitably develop products fast in large and small technology-businesses.

Problem definition, hypotheses formulation, methods to collect and examine data, and the identification of insights relevant to academics and practitioners are key components of this course.

Rationale
This course addresses the needs of students in the Master's in Telecommunications Technology Management program (thesis and project options). We will make best efforts to address the needs of special students and students enrolled in other programs.

Key research questions to be addressed in this course are:

1. what do you need to know and do to lead fast-to-market product teams?
2. what are the exemplary practices that are available to reduce cycle time?
3. what issues are key to fast-to-market product development?

Benefits
Students will benefit from:

- learning how to formulate testable hypotheses
- understanding the literature on fast-to-market product development
- developing skills in making, assessing and communicating recommendations on how to reduce cycle-time so as to introduce products profitably
- understand the role of open environments and ecosystems

Class Sessions
The thesis option of this course will be conducted in class. Project option students will participate online. Please see the instructions on joining an online classroom at (except that our conference room is 85101):

http://www.carleton.ca/tim/blindside.html

For the bi-weekly sessions, there will be assigned readings and tasks.

During the student group presentation sessions, groups will be asked to make short presentations on their assignments (max. 10 minutes; please practice so you stay on time). Each group decides who presents what and in which order. Before 5 p.m. EST the day prior to when presentations are due, each group will distribute to all members of the class the slides to be presented the next day. No exceptions.

Student Evaluation
Course participants are required to complete one group and one individual assignment, and write a final examination. To determine the course grade, these weights apply:

- Assignment 1 (group) 30%
- Assignment 2 (individual) 30%
- Exam 30%
- Class participation 10%

Assignments submitted late and presentations not made will receive a grade of zero. All students in a group receive the same grade. Final grade reports will follow Carleton University guidelines.

Assignment 1 (max. 10 pages)
This is a group assignment. Groups can have up to 3 members.

1. Describe a product opportunity (job to be done, gap, scenario)
2. Refine product opportunity into a value opportunity (who buys – stakeholders? what do they buy – general product attributes? why should they buy from you – unique capabilities?)

Presentation of version 1 due: July 21
Presentation of final version and submission of final document due: August 11

Assignment 2 (max. 5 pages)
This is an individual assignment.

Document a best practice for product development in the form of a pattern following the format in Kelly (2008). The best practice can be based on the literature or your own experience.

1. The pattern must clearly identify forces and consequences
2. The pattern must include three known uses

Version 1 of document to be workshopped due: July 28
Presentation of final version and submission of final document due: August 13

Exam
Handed out: July 31
Due: August 7, 6 p.m.

Class participation
Active class participation is an important component of this class:

1. Participation in class discussions (contribute to lessons learned at the end of each class, lead a discussion, provide feedback on the assignments of your classmates)
2. Summary of two assigned articles (100-250 word summary, three insights relevant to managers, three insights relevant to academics, assignments made during the first class)

Students with disabilities
Students with disabilities who require academic accommodations in this course are encouraged to contact the Paul Menton Centre (PMC) for Students with Disabilities to complete the necessary forms. After registering with the PMC, make an appointment with me in order to discuss your needs at least two weeks before the first assignment is due. This will allow for sufficient time to process your request

Plagiarism
Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not

be tolerated. Please refer to the section on instructional offenses in the Graduate Calendar for additional information. Plagiarism is against the TIM culture. A case of plagiarism will be referred to the Chair of the Department and the Carleton University Ethics Committee. The instructor will not deal with the matter directly. The university has clear processes to deal with students who are suspected of plagiarism.

Administrative details
These are the rules of conduct for this course:

- Please notify the instructor vie e-mail if you will not attend a class.
- You must be prepared for each class. You do so by reading the material assigned and being prepared to discuss in class how what was read can be applied in product development organizations.
- Each presenter must make his/her slides available to all other students by noon the day before.

Better Journals
Management Science
Organization Science
Journal of Product innovation Management
Academy of Management Journal
Academy of Management Review
Administrative Science Quarterly
IEEE Transactions on Engineering Management
R&D Management

Integrated Product Development: Schedule

Date	Topic	Readings
Jul 3	Session 1: Product development	• Schilling & Hill (1998) • Krishnan & Ulrich (2001) • Laseter & Kerber (2008) • Gerwin & Barrowman (2002)
Jul 7	Session 2: Flexibility	• MacCormack & Verganti (2003) • Gulati (2007) • Highsmith (2004) • Kelly (2008)
Jul 10	Session 3: Product concept (pre-recorded)	• Christensen et al. (2007) • Bettencourt & Ulwick (2008) • Cagan & Vogel (2002) • Thomke (2001)
Jul 14	Session 4: Product concept (pre-recorded)	
Jul 17	Session 5: Open environments	• Chesbrough & Appleyard (2007) • Chakravorti (2007) • Lakhani & Panetta (2007) • Thomke & von Hippel (2002)
Jul 21	Session 6: Present version 1 of assignment 1 Open source development	• Baldwin & Clark (2006) • Tuomi (2001)
Jul 24	Session 7: Open source development Product architecture	• Muffatto & Faldani (2003) • Duenas et al. (2007) • Nakakoji et al. (2002) • Pisano & Teece (2007)
Jul 28	Session 8: Workshop version 1 of assignment 2 (not a presentation, see class)	
Jul 31	Session 9: Platforms and ecosystems Exam out	• Grunwald & Kieser (2007) • Iyer & Davenport (2008) • Eisenmann (2007) • Evans et al. (2006)
Aug 4	Civic holiday	
Aug 7	Session 10: Product and technology evolution Intellectual property Exam due	• Matthyssens & Vandenbempt (2008) • Adomavicus et al. (2007) • Cusumano (2008) • Henkel (2006)
Aug 11	Session 11: Present version 2 of assignment 1 Assignment 1 document due	
Aug 13	Session 12: Present version 2 of assignment 2 Assignment 2 document due	

Readings

To access the required journal articles in electronic form, go to: http://www.library.carleton.ca, and click on "Journals & Journal Articles". Enter the name of the journal, and click "Search". Click on the link (there may be several), and enter your barcode number and PIN. For material on the Web, the URL is provided.

Adomavicus, G., Brockstedt, J., Gupta, A., & Kauffman, R. (2007), Technology role and paths of influence in ecosystem model of technology evolution, ***Information Technology and Management***, 8(2), 185-202.

Baldwin, C., & Clark, K. (2006), The architecture of participation: Does code architecture mitigate free riding in the open source development model?, ***Management Science***, 52(7), 1116-1127.

Bettencourt, L., & Ulwick, A., The customer-centered innovation map, ***Harvard Business Review***, 86(5), 109-114, May, 2008.

Cagan, J., & Vogel, C. (2002), A comprehensive approach to user-centered, integrated new product development, in: ***Creating Breakthrough Products: Innovation from Product Planning to Program Approval***, 107-137, Financial Times/Prentice Hall. (library, electronic resource)

Chakravorti, B. (2007), Innovation without borders, ***Innovations***, 2(3), 113-124, http://ideas.repec.org/a/tpr/inntgg/v2y2007i3p113-124.html.

Chesbrough, H., & Appleyard, M. (2007), Open innovation and strategy, ***California Management Review***, 50(1), 57-76.

Christensen, C., Anthony, S., Berstell, G., & Nitterhouse, D., Finding the right job for your product, ***Sloan Management Review***, 48(3), 38-47, Spring, 2007.

Cusumano, M., The Changing Software Business: Moving from Products to Services, ***IEEE Computer***, 20-28, January, 2008.

Duenas, J., Parada, H., Cuadrado, F., Santillan, M., ad Ruiz, J. (2007), Apache and Eclipse: Comparing open source incubators, ***IEEE Software***, November/December, 90-98

Eisenmann, T. (2007), Managing proprietary and shared platforms: a life cycle view, ***Harvard Business School Working Papers***, 07-105.

Evans, D., Hagiu, A., & Schmalensee, R. (2006), With a Little Help …, in: ***Invisble Engines: How Software Platforms Drive Innovation and Transform Industries***, 245-274, MIT Press, http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=10937.

Gerwin, D., & Barrowman, N. (2002), An evaluation of research on integrated product development, ***Management Science***, 48(7), 938-953.

Grunwald, R., & Kieser, A. (2007), Learning to reduce interorganizational learning: An analysis of architectural product innovation in strategic alliances, ***Journal of Product Innovation Management***, 24(4), 369-391.

Gulati, R. (2007), Silo busting: How to execute on the promise of customer focus, ***Harvard Business Review***, 85(5), 98-108.

Henkel, J. (2006), Selective revealing in open innovation processes: The case of embedded Linux, ***Research Policy***, 35(7), 953-969.

Highsmith, J. (2004), Practice: Low-cost change, in: ***Agile Project Management: Creating Innovative Products***, Addison Wesley, 170-181. (library, electronic resource)

Iyer, B., & Davenport, T. (2008), Reverse Engineering Google's Innovation Machine, ***Harvard Business Review***, 86(4), 59-68.

Krishnan, V., & Ulrich, K. (2001), Product development decisions: A review of the literature, ***Management Science***, 47(1), 1-21. (covered in TTMG 5001)

Lakhani, K., & Panetta, J. (2007), The Principles of Distributed Innovation, ***Innovations***, 2(3), 97-112, http://ideas.repec.org/a/tpr/inntgg/v2y2007i3p97-112.html.

Laseter, T., & Kerber, R. (2008), Launch and Learn, ***Strategy + Business***, 50, Spring, 1-6.

MacCormack, A., & Verganti, R. (2003), Managing the source of uncertainty: Matching process and context in software development, ***Journal of Product and Innovation Management***, 20(3), 217-232.

Matthyssens, P., & Vandenbempt, K. (2008), Moving from basic offerings to value-added solutions: Strategies, barriers and alignment, ***Industrial Marketing Management***, 37(3), 312-328.

Muffatto, M., & Faldani, M. (2003), Open source as a complex adaptive system, ***Emergence***, 5(3), 83-100.

Nakakoji, K., Yamamoto, Y., Nishinaka, Y., Kishida, K., & Ye, Y. (2002), Evolution patterns of open source software systems and communities, ***International Workshop on Software Evolution***, 76-85, ACM http://portal.acm.org/citation.cfm?id=512055.

Schilling, M., & Hill, C. (1998), Managing the new product development process: Strategic imperatives, ***Academy of Management Executive***, 12(3), 67-81.

Thomke, S., & von Hippel, E., Customers as innovators: A new way to create value, ***Harvard Business Review***, 80(4), 74-81, 2002

Thomke, S., Enlightened experimentation: The new imperative for innovation, ***Harvard Business Review***, 79(2), 67-75, February, 2001.

Tuomi, I. (2001), Internet, innovation, and open source: Actors in the network, ***First Monday***, 6(1), http://www.firstmonday.org/issues/issue6_1/tuomi.