

TTMG 5001 (formerly 96.501)

MANAGEMENT PRINCIPLES FOR ENGINEERS

Fall 2003

Department of Systems and Computer Engineering
Carleton University

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Tuesday, 6:05 to 8:55 p.m.
236 Tory Building

Office Hours

Office hours are from 5:30 to 6:30 p.m. on Monday and 5 to 6 p.m. on Tuesday. The instructor is also available via e-mail any time.

Calendar Description

TTMG 5001 [0.5 credit] (formerly 96.501)

Management Principles for Engineers

Develops a common level of knowledge among students on topics in project management, leadership, industrial marketing, managerial economics and organizational behaviour. These topics are relevant for engineers and computer scientists who manage the engineering processes that deliver innovative telecommunications systems, products and services.

Course Objectives

We learn about topics that are critical for dynamic telecommunications technology-based companies to compete in the global market. These topics include:

- Product and service development
- Sources of competitive advantage, innovation evolution, and sustainable growth
- Technical entrepreneurship and commercialization

The topics listed above cut across functional management areas and are examined from the perspective of the development project manager. These topics build on the literature in the fields of project management, industrial marketing, organizational behavior, leadership and managerial economics.

This course introduces students to the literature in the field of engineering management.

Rationale

The course is integrated around the work that development project managers actually do, and the context within which they act. In organizing the course, we rejected the traditional organization around functional areas such as organizational behaviour, marketing, managerial economics, etc. for two reasons. First, engineers and computer scientists who are responsible for engineering processes in the real world make management decisions that are integrative and rarely can these decisions be compartmentalized by functional management areas. Second, the delivery of a course partitioned by function frequently turns into a series of disjointed lectures with no evident interdependences.

From our research and consulting experience and the research of others we found that in successful telecom technology-based companies the development project is the main mechanism for learning and profit generation and that the project manager is the one person that can make or break the project.

All master's students in the M.Eng. in Telecommunications Technology Management program are required to complete this course.

Benefits

Students will benefit from:

- acquiring a set of tools and concepts that can be applied to improve their product development organizations
- gaining confidence in management decision-making in technical environments and undertaking research work
- using lessons learned in other settings to solve product development problems,
- developing personal skills in making, assessing and communicating recommendations on how to improve development organizations

Class Sessions

Class sessions will be conducted as lecture and discussion sessions. For each class, there will be assigned readings and an updated set of lessons learned.

During each class, students will be selected to make short-minute presentations on how what is in the assigned readings can be applied to technology-based companies. The value of the presentation is to link insights gained by reading the literature and development management practice, not to repeat what is in the article.

An excellent student presentation does not exceed 8-10 minutes, is crisp and insightful, and provides

- three key lessons learned or insights gained from the assigned readings
- specific activities that should be undertaken by managers of a product development organization to improve performance

Each student selected for possible presentation must make his/her slides available to classmates by 5 p.m. the day before. Each presentation will be followed by clarification questions and a discussion that will be open to the entire class.

Success as a manager depends on verbal communication skills. This course provides an opportunity for students to develop their ability to make recommendations to their peers.

Required Readings

The articles below are required and they can be accessed online at: catalogue.library.Carleton.ca

Brown, Shona L. and Kathleen M. Eisenhardt (1995) "Product Development: Past research, present findings and future directions", *Academy of Management Review*, 20(2), 343-378.

Bunderson, J. S., and Sutcliffe, K. M. (2002) Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process And Performance Effects," *Academy of Management Journal*, Vol.45 (5), p. 875-893.

Carlsson, Bo, Staffan Jacobson, Magnus Holmén, and Annika Rickne (2002) Innovation systems: analytical and methodological issues, *Research Policy*, 31, p. 233-245.

Chen, M. and Hambrick, D. C. (1995) Speed, Stealth, and Selective Attack: How small firms Differ From Large Firms in Competitive Behavior, *Academy of Management Journal*, Vol. 3 (2), p. 453-482.

Datar, S., Jordan, C., Kekre, S., Rajiv. S. and Srinivasan, K. (1997) *New Product Development Structures and Time-to-Market*", Management Science, Vol. 43 (4).

Debruyne, M., Moenaert, R., Griffin, A., Hart, S., Hultink, E. J., and Robben, H. (2002) The impact of new product launch strategies on competitive reaction in industrial markets, *The Journal of Product Innovation Management*, Vol.19, p. 159-170.

Di Benedetto, C. A. (1999) Identifying the key success factors in new product launch.” *The Journal of Product Innovation Management*, Vol. 16, p. 530-544.

Eisenhardt, Kathleen M. and Behnam N. Tabrizi (1995) Accelerating Adaptive Processes: Product innovation in the global computer industry, *Administrative Science Quarterly*, 40, (1), p. 84-110.

Ferrier, Walter J. (2001) Navigating the Competitive Landscape: The Drivers And Consequences of Competitive Aggressiveness, *Academy of Management Journal*, Vol. 44, p. 858-878.

Guiltinan, J. P. (1999) Launch strategy, launch tactics, and demand outcomes, *The Journal of Product Innovation Management*, Vol.16, p. 509-529.

Goldenberg, Jacob; Lehmann, Donald R.; Mazursky, David (2001) The Idea Itself and the Circumstances of its Emergence as Predictors of New Product Success, *Management Science*, Vol. 47 (1), p. 69-85.

Krishnan, V. and S. Gupta (2001) Appropriateness and Impact of Platform-Based Product Development *Management Science*, Vol. 47, (1) p. 52-69.

Krishnan, V. and K. Ulrich (2001) Product Development Decisions: A Review of the Literature”, *Management Science*, Vol. 47 (1), p.1-21.

Krishnan, V. and S. Bhattacharya (2002) Technology Selection and Commitment in New Product Development: The role of uncertainty and design flexibility, *Management Science*, Vol.48 (3), p. 313-327.

Lewis, M.W., Welsh, M.A., Dehler, G.E. and Green, S.G. (2002) Product Development Tensions: Exploring Contrasting Styles of Project Management, *Academy of Management Journal*, Vol.45 (3), p. 546-564.

Lumpkin, G. T. and G. C. Dess, G. G. (1996) Clarifying the entrepreneurial orientation construct and linking it to performance, *Academy of Management Review*, Vol. 21, pp. 135-172.

MacCormack, A., R. Verganti, and M. Iansiti (2001) Developing Products on Internet Time: The Anatomy of a Flexible Development process, *Management Science*, Vol.47, (1), p.133-150.

Malerba, Franco (2002) Sectoral systems of innovation and production, *Research Policy* 31, p. 247-264.

McDermott, Christopher and Gina Colarelli O’Connor (2002) Managing radical innovation: an overview of emergent strategy issues, *Journal of Product Innovation Management*, 19: 424-438.

Souitaris, Vangelis (2002) Technological trajectories as moderators of firm level determinants of innovation, *Research Policy*, 31, p. 877-898.

Tatikonda, M.V. and M.M. Montoya-Weiss (2001) “Integrating Operations and Marketing Perspectives of Product Innovation: The Influence of Organizational Process Factors and Capabilities on Development Performance”, *Management Science*, Vol. 47 (1), p.151-172.

Tether, Bruce (2002) Who co-operates for innovation, and why: An Empirical analysis, *Research Policy*, 31, p. 947-967.

Van den Ende (2003) Modes of governance of new service development for mobile networks: A life cycle perspective, *Research Policy*, 32, p. 1501-1518.

Reference Texts

Baghai, Mehrdad, Stephen Coley and David White (2000) *The Alchemy of Growth*, Perseus Publishing; ISBN 0-7382-0309-2.

Betz, Frederick (2003) *Managing Technological Innovation*. John Wiley; ISBN: 047122563.

Burgelman, Robert A., Modesto A. Maidique and Steven C. Wheelwright (2001) *Strategic Management of Technology and Innovation*. McGraw Hill-Irwin; ISBN: 0072312831.

Christensen, Clayton and Michael E. Raynor (2003) *The Innovators Solution*. Harvard Business School Press; ISBN: 1578518520

Clark, Kim B. and Steven C. Wheelwright (1992) *Managing New Product and Process Development: Text and Cases*. Free Press; ISBN: 0029055172.

Collins, Jim (2001) *Good to Great: Why Some Companies Make the Leap...and Others Don't*, New York: Harper Business, ISBN 0-06-662099-6

Cooper, Robert G. (2001) *Winning at New Products: Accelerating the Process from Idea to Launch*, 3rd edition, Perseus Publishing; ISBN: 0738204633

Downes, Larry and Chunka Mui (1998) *Unleashing the Killer App*, Harvard Business School Press; ISBN: 087584801X

Fine, Charles (1998) *Clock Speed: Winning Industry Control in the Age of Temporary Advantage*, Perseus Books; ISBN: 0738201537

Fleisher, Craig and Babette E. Bensoussan (2002). *Strategic and Competitive Analysis: Methods and Techniques for Analyzing Business Competition*. Prentice Hall, N.J. ISBN 0130888524.

Foster, Richard and Sarah Kaplan (2001) *Creative Destruction*. Doubleday; ISBN: 0385501331.

Harris, Jim (2002) *Blindsided: How to spot the next breakthrough that will change your business forever*, Oxford, U.K.: Capstone, ISBN 1-84112-242-4

Jolly, Vijay K. (1997) *Commercializing New Technologies*, Harvard Business School Press, ISBN: 0875847609

Moore, Geoffrey A. (2000) *Living on the Fault Line*. Harper Business, ISBN: 0060086769.

Patterson, Marvin L. and Sam Lightman (1997) *Accelerating Innovation: Improving the Process of Product Development*, John Wiley & Sons; ISBN: 0471285463.

Schein, Edgar H. (1999) *Corporate Culture: The Survival Guide*, San Francisco: Jossey Bass, ISBN 0-7879-4699-0

Smith, Preston G. and Donald Reinertsen (1998) *Developing Products in Half the Time, New Rules New Tools*, 2nd edition, John Wiley & Sons; ISBN: 0471292524.

Student Evaluation

Students are required to complete two assignments, write a final examination, and make presentations during class sessions. To determine the course grade, these will be weighted as follows:

- Assignment 1 30%
- Assignment 2 30%
- Final Examination 30%
- Presentations 10%

Final grade reports will follow Carleton University guidelines.

Assignment 1: Literature review

Work in groups of 2-4 individuals to:

- Identify a research question
- Review the academic literature relevant to the research question
- Provide five insights from the literature review
- Identify three ways to contribute to the literature

To understand what a good literature review looks like, please read: Brown, Shona L. and Kathleen M. Eisenhardt (1995) "Product Development: Past research, present findings and future directions", *Academy of Management Review*, 20(2), 343-378.

The list of better journals includes: *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*; *Research Policy*, and *R&D Management*. These journal can be accessed online at catalogue.library.carleton.ca

Due dates

Sep 30	Written notification of group composition, status report (2 pages max) and short presentation
Oct 21	Present version 1 of Assignment 1
Nov 18	Submit Assignment 1. Submit 15 pages of body maximum. You can add as many appendices and references as you'd like. I expect a professionally written literature review: interesting, clear, concise, and well organized.
Nov 25	Present final version of Assignment 1

Assignment 2: Gate 0 proposal

Work in groups of 2-4 individuals to:

- Prepare a Gate 0 proposal following the guidelines in "TTM Thesis Development"
- Present and defend the Gate 0 proposal

Due dates

Sep 30	Written notification of group composition, status report (2 pages max) and short presentation
Oct 28	Present version 1 of Assignment 2
Nov 25	Submit Assignment 2. Submit 10 pages of body maximum. You can add as many appendices and references as you'd like. I expect a professionally written report: interesting, clear, concise, and well organized.
Dec 2	Present final version of Assignment 2

Exam

The take home exam is an individual effort. The exam will be distributed on Tuesday Nov 25 and is due on Tuesday Dec 2, at 6 p.m.

Group Work

Group work is an important component of this course. You may elect to work in the same group to prepare both assignments or work in two different groups. Group conflicts are to be dealt with by the group in a way that is fair, fast and without personal attacks.

Free-loaders are not welcome anywhere. This course is no exception. The best way to deal with free loaders is to not include their names in the first page of the group assignments. If a student's name does not appear in an assignment submitted by his or her group, the student must submit his or her own assignment. There is zero tolerance for free loaders.

Students with Disabilities

Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre (PMC) for Students with Disabilities to complete the necessary *letters of accommodation*. After registering with PMC, make an appointment to meet and discuss your needs with your instructor at least two weeks prior to the midterm exam. This is necessary in order to ensure sufficient time to make the necessary arrangements. Please note the following deadlines for submitting completed forms to the Paul Menton Centre: November 1 for Fall term courses.

Plagiarism

Passing the work of others as if it was your own is a serious offence. There is zero tolerance for plagiarism.

Administrative Details

Missing Classes

- Please notify the instructor via e-mail if you will not attend a class.
- If a student misses a class, it is the student's responsibility to find out from classmates what was covered, what assignments were made and what handouts were distributed.

Class Preparation

- 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.
- Students selected for potential presentation must make their slides available to all other students by 5 p.m. the day before.
- If an emergency prevents you from being prepared for class, notify the instructor before the start of class.

Starting and Ending on Time

- The instructors does his best to use class time effectively, each class will start and end on time.
- Students should not make being late for class a habit.

Due dates

Each Tuesday Presentations on how what is in the assigned readings can be applied to product development and technology-businesses.

Sep 30 Group composition and short presentation of status report on Assignments 1 and 2

Oct 21 Presentation of version 1 of Assignment 1

Oct 28 Presentation of version 1 of Assignment 2

Nov 18 Submit Assignment 1

- Nov 25
- Submit Assignment 2
 - Presentation of final version of Assignment 1
 - Exam is provided to students
- Dec 2
- Submit Exam

- Presentation of final version of Assignment 2

TTMG 5101 Class by Class Schedule Fall 2003

Date	Topic	Article
Sep 9	Introduction and administrative matters	<ul style="list-style-type: none"> • Course Outline • TTM Thesis Development
Sep 16	Product Development	<ul style="list-style-type: none"> • Brown and Eisenhardt (1995) • Krishnan and Ulrich (2001) • Goldenberg et. al (2001)
Sep 23	Product Development	<ul style="list-style-type: none"> • Eisenhardt and Tabrizi (1995) • Souitaris (2003) • Tatikonda and Montoya-Weiss (2001)
Sep 30	Product Development	<ul style="list-style-type: none"> • Krishnan and Gupta (2001) • McDermott and Colarelli O'Connor (2002) • Datar et. al. (1997)
Oct 7	Competitive advantage, innovation evolution and growth	<ul style="list-style-type: none"> • Carlsson et. al. (2002) • Ferrier (2001) • Malerba (2002)
Oct 14	Competitive advantage, innovation evolution and growth	<ul style="list-style-type: none"> • Krishnan and Bhattacharya (2002) • Van den Ende (2003)
Oct 21	<ul style="list-style-type: none"> • Presentation of version 1 of Assignment 1 • Competitive advantage and growth 	<ul style="list-style-type: none"> • Bunderson and Sutcliffe (2002)
Oct 28	<ul style="list-style-type: none"> • Presentation of version 1 of Assignment 2 • Competitive advantage and growth 	<ul style="list-style-type: none"> • Tether (2002)
Nov 4	Entrepreneurship and commercialization	<ul style="list-style-type: none"> • Chen and Hambrick (1995) • Lumpkin and Dess (1996)
Nov 11	Commercialization	<ul style="list-style-type: none"> • Debruyne et. al. (2002) • Di Benedetto (1999) • Guiltinan, J. P. (1999) •
Nov 18	<ul style="list-style-type: none"> • Entrepreneurship and commercialization • Presentation of final version of Assignment 1 	
Nov 25	<ul style="list-style-type: none"> • Lessons learned • Presentation of final version of Assignment 1 	
Dec 2	<ul style="list-style-type: none"> • Summary of course • Presentation of final version of Assignment 2 	

