

ADM9935

Gestion des projets d'innovation

(Management of Innovation Projects)

-- Course outline--

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**Le séminaire se donne en français et en anglais.
The seminar is given in English and in French**

STUDENTS WHO COULD BENEFIT FROM THIS COURSE

This course can greatly benefit students enrolled in various concentrations of the joint doctoral program in administration.

Students who specialize in *technology and innovation in management*, *organization and management theory*, and *project management* are directly targeted by the course. This course focuses on organizational phenomena and management approaches that are typical in contexts characterized by innovation, projects, and multidisciplinary. The course gives a particular attention to theories about the role of knowledge, including its acquisition, production and integration in situations in which both the knowledge and the various activities that produce it are distributed across organizational units and inter-organizational networks.

Students specializing in business policy and *strategy* can better understand the underlying factors that impact the development of organizational capabilities related to innovation

and technology, and deepen their grasp of topics that figure prominently in many theories about competitive strategy, such as dynamic environments and networks of innovators.

Students in *entrepreneurship* can deepen their understanding of the problems faced by start-ups that develop an innovation. The course will help them better grasp the life cycle of such companies, the nature of the uncertainties and risks they face, their competency and resource requirements , etc..

Marketing students can deepen their knowledge on the development of new products, including analysis of customer needs and market dynamics, the development of product concepts, as well as interactions between the marketing function and other functions in innovative organizations.

In addition, the course can help students in *management information systems*, and in *information and communication technologies* concentrations to better understand the social processes that determine the success of development projects for new systems and products.

Finally, students from other doctoral programs such as those in science, technology and society or in industrial engineering, can benefit from this course

COURSE DESCRIPTION

The course aims to familiarize the students with the different strands of research on the management of innovation projects. The course content is divided into thirteen themes.

A first series of four themes presents basic concepts essential for understanding the course. The first theme discusses the social and organizational processes at a fundamental level. The second offers an overview on innovation projects. The other two address more broadly the nature of knowledge and, respectively, the knowledge production processes.

Subsequent themes address in depth some topics that are typical for innovation projects (or for any project with a certain degree of novelty), including the analysis of user needs, the acquisition and integration of knowledge, the development of a technical concept and a product architecture, the creation of a project team, the evaluation of project revenues, costs and risks, and capturing the value generated by the innovation. Special themes are dedicated to understanding the challenges posed by the organizational context of the project and by dynamic environments, such as those of high-tech industries.

The theoretical contributions which will be discussed come from a broad range of disciplines such as sociology, economics, philosophy, management, marketing, psychology, engineering, etc. The empirical research discussed in these topics covers a wide variety of industries such as IT, automotive, biopharmaceuticals, services etc.

OBJECTIVES

1. Familiarize students with the key research questions related to the management of innovation projects
2. Discuss the assumptions, theoretical frameworks and hypotheses proposed by different streams of research that have addressed these issues, and compare their results
3. Present theoretical approaches that, while addressing primarily other concerns, can also contribute to the literature in innovation project management
4. Help students to identify gaps in current theories and formulate new research questions and hypotheses

TEACHING APPROACH

This seminar favors class discussions with the active participation of students rather than lectures. Past experience shows that classes which bring together students whose primary language is English and students that speak primarily French can sustain captivating discussions.

Students also will work autonomously, supervised by the professor, to prepare a theoretical paper (see next section).

RATING

- 15% for participation in class discussions (students must demonstrate a familiarity with all the readings for each theme without having to read through each of these readings)
- 35% for brief reviews of seven (7) research articles or book chapters among those proposed in the syllabus. Students will prepare a review of maximum two pages, which they will read in class and will then submit to the professor. For each review, a student will receive a maximum of 5% to the final grade.
- 50% an in-depth literature review of contributions that address one of the 13 themes of the course, presented in conference paper format (25-30 pages double-spaced).

SUGGESTED READINGS BY THEME

The site www.gpi.uqam.ca is a good preparatory source for this course

Theme 1: Fundamentals: action, knowledge and structural context **Fondements : action, savoir et contexte structurel**

- *Hayek, F. A. 1945. "The use of knowledge in society." *American Economic Review*, 35: 519-530.
- *Meyer, J. W., and Rowan, B. 1977. "Institutionalized organizations: Formal structure as myth and ceremony." *American Journal of Sociology*, vol. 83, p. 340-363
- *Granovetter, M. 1985. "Economic action and social structure: The problem of embeddedness." *American Journal of Sociology*, vol. 91, no 3, p. 481-510.
- *Callon, M. 1986. "Éléments pour une sociologie de la traduction. La domestication des coquilles Saint-Jacques et des marins pêcheurs en baie de Saint-Brieuc" *L'Année Sociologique*, 36 : 169-208. En anglais : "Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay." In J. Law (ed.): *Power, action and belief: a new sociology of knowledge?* London, Routledge, p.196-223.
- *Orlikowski, W. 1992. "The duality of technology: Rethinking the concept of technology in organizations." *Organization Science*, Vol. 3, No. 3, p. 398-427.
- *Mitcam, C. 1994. *Thinking Through Technology*. Chicago : University of Chicago Press. Chapters 7 to 10.
- *Emirbayer, M. and Mische, A. 1998. "What is agency?" *American Journal of Sociology*, 103(4): 962-1023.

Theme 2 Overview of innovation project issues **Problématique des projets d'innovation**

- *Clark, K., and T. Fujimoto. 1991. *Product Development Performance*. Boston, MA: Harvard Business School Press.
- *Brown, S.L., K.M. Eisenhardt. 1995. "Product development: Past research, present findings, and future directions." *Academy of Management Review*, 20: 343-378.
- *Ulrich, K.T., and Eppinger, S.D. 2000. *Product Design and Development (2nd ed.)*. New York: McGraw-Hill.
- *Krishnan V., and Ulrich, K. T. 2001. "Product Development Decisions: A Review of the Literature" *Management Science*, 47(1): 1-21.
- Shenhar, A. J. 2001. "One size does not fit all projects: Exploring classical contingency domains." *Management Science*, 47(3): 395-414

- Florichel, S. and Miller, R. 2003. "An exploratory comparison of the management of innovation in the New and Old Economy." *R&D Management*, 35(5): 501-525.
- Hauser, J., Tellis, G. J., Griffin, A. 2006. Research on Innovation: A Review and Agenda for Marketing Science. *Marketing Science*, 25(6): 687-717.
- Miller, R. and Florichel, S. 2007. "Games of innovation: A new theoretical perspective." *International Journal of Innovation Management*, Vol. 11, No. 1, p. 1-36.

Theme 3: Knowledge and innovation
Savoir et innovation

- *Bunge, M. 1967. "Technology as applied science." *Technology and Culture*, 7(3): 329-347.
- *Polanyi, M. 1966. *The Tacit Dimension*. Garden City, NY: Doubleday.
- *Vincenti, W. G. 1990. *What Engineers Know and How They Know It*. Baltimore: John Hopkins University Press.
- *Bohn, R. E. 1994. "Measuring and managing technological growth." *Sloan Management Review*, (Fall) p. 61-73.
- *Garud, R. 1997. "On the distinction between know-why, know-how, and know-what in technological systems." In *Advances in Strategic Management*, J. Walsh and A. Huff (Eds.), p. 81-101. Greenwich, Conn.: JAI Press.
- Argote, L. 1999. *Organizational learning: Creating, retaining, and transferring knowledge*. Norwell, MA: Kluwer.
- Eisenhardt, K., and Santos, F.M. 2002. "Knowledge-based view: a new theory of strategy?" In A. Pettigrew, T. Howard, & R. Whittington (Eds.), *Handbook of strategy and management*: 139-164. London: Sage Publications.
- Florichel, S., Michela, J. and George, M. with Bonneau L. 2011. *Refining the Knowledge Production Plan: Knowledge Representations In Innovation Projects*. Newton Square, PA: Project Management Institute.

Theme 4: Knowledge production processes
Les processus de production de savoir

- *Campbell, D. T. 1960. "Blind variation and selective retention in creative thought as in other knowledge processes." *Psychological Review*, 67(November): 380-400.
- March, J. G. 1991. "Exploration and exploitation in organizational learning." *Organization Science*, 2: 71-87.
- *Nonaka, I. 1994. "A dynamic theory of organizational knowledge creation." *Organization Science*, Vol. 5, p. 14-37.
- *Hargadon, A. and Sutton, R. I. 1997. "Technology brokering and innovation in a product development firm." *Administrative Science Quarterly*, 42(4):716-749.

- Nightingale, P. 1998. "A cognitive model of innovation." *Research Policy*, 27: 689–709.
- Cook, S. D. N. et Brown, J. S. 1999. "Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing." *Organization Science*, 10(4): 381-400.
- Thomke, S. H. 1998. "Managing experimentation in the design of new products." *Management Science*, 44(6): 743-762.
- Fleming, L. and Sorenson, O. 2004. "Science as a map in technological search." *Strategic Management Journal*, 25: 909-925.

Theme 5: Understanding user needs and value and their impact on projects
Valeur et besoins des utilisateurs et leur impact sur le projet

- *von Hippel, E. S. 1986. "Lead users: A source of novel product concepts." *Management Science*, 32(7): 791-805.
- *Urban, Glenn L. and John R. Hauser 1993. *Design and Marketing of New Products* (2me éd.). Englewood Cliffs, NJ: Prentice-Hall, ISBN: 0-13-201567-6, 701 p.
- *Griffin, A., and Hauser, J. R. 1993. "The voice of the customer." *Marketing science*, 12(1): 123-142.
- Arnould, Eric J. and Price, Linda L. 1993. River Magic: Extraordinary Experience and the Extended Service Encounter. *Journal of Consumer Research*, 20(1): 24-45.
- *Lynn, G., Morone, J., and Paulson, A. 1996. "Marketing discontinuous innovation: The probe and learn process." *California Management Review*, 38(3): 8–37.
- *Woodruff, R. B. 1997. "Customer value: The next source for competitive advantage." *Journal of the Academy of Marketing Science*; 25(2): 139-153.
- van Kleef, E., van Trijp, H. C. M., and Luning, P. 2005. "Consumer research in the early stages of new product development: a critical review of methods and techniques." *Food Quality and Preference*, 16(3): 181–201.
- Rindova, V. P., and Petkova, A. P. 2007. "When is a new thing a good thing? Technological change, product form design, and perceptions of value for product innovations." *Organization Science*, 18(2): 217-232.

Theme 6: Knowledge integration in innovation projects
Intégration du savoir dans les projets d'innovation

- *Brown, J. S., and Duguid, P. 1991. "Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation." *Organization Science*, February, 2(1): 40-57.
- *Dougherty, D. 1992. "Interpretive barriers to successful product innovation in large firms." *Organization Science*, 3(2): 179–202.

- *Mowery, D. C., Oxley, J. E., and Silverman, B. S. 1996. "Strategic alliances and interfirm knowledge transfer." *Strategic Management Journal*, 17(Winter): 77-91.
- Prencipe, A. and Tell, F. 2001. "Inter-project learning: processes and outcomes of knowledge codification in project-based firms." *Research Policy*, 30: 1373-1394.
- Takeishi, A. 2001. "Bridging inter- and intra-firm boundaries: Management of supplier involvement in automobile product development." *Strategic Management Journal*, 22: 403-433.
- Carlile, P. R. 2002. "A pragmatic view of knowledge and boundaries: Boundary objects in new product development" *Organization Science*, 13(4): 442-455.
- Ewenstein, B. and Whyte, J. 2009. "Knowledge practices in design: The role of visual representations as 'Epistemic Objects'." *Organization Studies*, 30(1): 7-30.

Theme 7: Network configurations and knowledge advantage
La configuration des réseaux et l'accès au savoir

- *M. Granovetter, M. S. 1973. "The strength of weak ties." *American Journal of Sociology*, 78(6): 1360-1380.
- *Powell, W. W., Koput, K. W., and Smith-Doerr, L. 1996. "Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology." *Administrative Science Quarterly*, 41: 116-145.
- *Podolny, Joel M., Toby E. Stuart, and Michael T. Hannan. 1996. "Networks, knowledge, and niches." *American Journal of Sociology*, 102: 659-89.
- Uzzi, B. 1997. "Social structure and competition in interfirm networks: The paradox of embeddedness." *Administrative Science Quarterly*, 42: 35-67.
- *Hansen, M. T. 1999. "The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits." *Administrative Science Quarterly*, 44(1): 82-111.
- Reagans, R., and Zuckerman E. W. 2001. "Networks, Diversity, and Productivity: The Social Capital of Corporate R&D Teams." *Organization Science*, 12(4): 502-517.
- Garud, R. and P. Karnøe. 2003. "Bricolage versus breakthrough: distributed and embedded agency in technology entrepreneurship." *Research Policy*, 32: 277-300.
- Florice, S. and Dougherty, D. 2007. "Where do games of innovation come from? Explaining the persistence of dynamic innovation patterns." *International Journal of Innovation Management*, Vol. 11, No. 1, p. 65-92.

Theme 8: Technical design, architecture and organizations
Conception, architecture et organisations

- *Clark, K.B. 1985. The interaction of design hierarchies and market concepts in technological evolution. *Research Policy*, 14: 235-251.

- *Henderson, R. M., and Clark, K. B. 1990. "Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms." *Administrative Science Quarterly*, vol. 35, p. 9-30
- Sanderson, S., and Uzumeri, M. 1995. "Managing product families: The case of Sony Walkman." *Research Policy*, vol. 24, no 5, p. 761-782.
- *Sanchez, R., and Mahoney, J. T. 1996. "Modularity, flexibility, and knowledge management in product and organization design." *Strategic Management Journal*, vol. 17, Winter Special Issue, p. 63-76.
- *Ulrich, K. 1995 "The role of product architecture in the manufacturing firm." *Research Policy*, 24: 419-440.
- Schilling, M. A. 2000. "Towards a general modular systems theory and its application to interfirm product modularity." *Academy of Management Review*, 25(2): 312-334.
- Brusoni, S., Prencipe, A. et Pavitt, K. 2001. "Knowledge Specialization, Organizational Coupling, and the Boundaries of the Firm: Why Do Firms Know More than They Make?" *Administrative Science Quarterly*, 46(4): 597-621.
- Visser, W. 2006. "Designing as construction of representations: A dynamic viewpoint of cognitive design research." *Human-Computer Interactions*, 21: 103-152.

Theme 9: Individuals, teams, roles, and creativity in innovation projects
Individus, équipes, rôles et créativité dans les projets d'innovation

- Tushman, M. L. 1977. "Special boundary roles in the innovation process." *Administrative Science Quarterly*, 22(4): 587-605.
- *Barley, S. R. 1986. "Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments." *Administrative Science Quarterly*, 31: 78-108.
- *Ancona, D. G. and Caldwell, D. F. 1992. "Demography and design: Predictors of new product team performance." *Organization Science*, 3(3): 321-341.
- *Woodman, R. W., Sawyer, J. E. and Griffin, R. W. 1993. "Toward a theory of organizational creativity". *Academy of Management Review*, 18(2): 293-321.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., Herron, M. 1996. "Assessing the work environment for creativity." *Academy of Management Journal*, 39(5): 1154-1184.
- Lubart, T. I. 2001. "Models of the Creative Process: Past, Present and Future." *Creativity Research Journal*, 13(3 & 4): 295-308.

Keller, R. T. 2001. "Cross-functional project groups in research and new product development: Diversity, communications, job stress, and outcomes." *Academy of Management Journal*, 44(3): 547-555.

Gibson, C. B. and Gibbs, J. L. 2006. "Unpacking the Concept of Virtuality: The Effects of Geographic Dispersion, Electronic Dependence, Dynamic Structure, and National Diversity on Team Innovation." *Administrative Science Quarterly*, 51(3): 451-495.

Theme 10: Organizational systems and innovation projects
Systèmes organisationnels et les projets d'innovation

*Burgelman, R. A. 1983. "A process model of corporate venturing." *Administrative Science Quarterly*, 28: 223-244.

*Prahalad, C. K. and Hamel, G., 1990. "The core competence of the corporation." *Harvard Business Review*. 68(3):79-91.

*Cohen, W. M., and Levinthal, D. A. 1990. "Absorptive capacity: A new perspective of learning and innovation." *Administrative Science Quarterly*, 35: 128-152.

*Jelinek, M, and Schoonhoven, C. B. 1990. *The Innovation Marathon: Lessons from High Technology Firms*. Cambridge, Mass: Basil Blackwell.

Day, G. S. 1994. "The Capabilities of Market-Driven Organizations." *Journal of Marketing*, 58(4): 37-52.

*Christensen, C. 1997. *The Innovator's Dilemma*. New York: Harper Business.

Leifer, R., McDermott, C.M., Colarelli O'Connor, G., Peters, L.S., Rice, M., Veryzer, R.W. 2000. *Radical Innovation: How Mature Companies Can Outsmart Upstarts*. Boston: Harvard Business School Press

Dougherty, D. 2001. "Reimagining the differentiation and integration of work for sustained product innovation." *Organization Science*, 12(5): 612-631.

Theme 11: Estimation, activity scheduling, uncertainty and risk
Estimation, planification des activités, incertitude et risque

*Bass, F. M. 1969. "A new product growth model for consumer durables." *Management Science*, 15(5, Theory Series): 215-227.

*Boehm, B. 1988. "A spiral model of software development and enhancement." *IEEE Computer*, 21(5): 61-72.

Boehm, B.W., and Papaccio, P.N. 1988. "Understanding and controlling software costs." *IEEE Transactions on Software Engineering*, 14(10): 1462-1477

Eppinger, S. D., Whitney, D. E., Smith, R. P., and Gebala, D. A. 1994. "A model-based method for organizing tasks in product development." *Research in Engineering Design*, 6: 1-13.

- *Krishnan, V., Eppinger, S.D., Whitney, D. E. 1997. “A model based framework to overlap product development activities.” *Management Science*, 43(4): 437-451.
- DiMasi, J. A., Hansen, R. W., and Grabowski, H. G. 2003. “The price of innovation: New estimates of drug development costs.” *Journal of Health Economics*, 22: 151–185.
- Jørgensen, M. 2004. “A review of studies on expert estimation of software development effort.” *Journal of Systems and Software*, 70: 37–60.
- Cooper, R. G. 2008. “Perspective: The Stage-Gate idea-to-launch process—Update, what’s new, and NexGen Systems.” *Journal of Product Innovation Management*, 25: 213–232.

Theme 12: Managing projects in high-velocity and turbulent environments
Gérer les projets en contexte de changement rapide et turbulence

- *Tushman, M. L., and Anderson, P. 1986. “Technological discontinuities and organizational environments.” *Administrative Science Quarterly*, 31: 439-465.
- *Eisenhardt, K.M. 1989. “Making fast strategic decisions in high-velocity environments.” *Academy of Management Journal*, 32: 543–576.
- *Brown, S. L., and Eisenhardt, K. M. 1997. “The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations.” *Administrative Science Quarterly*, 42: 1-34.
- *Teece, D. J., Pisano, G., and Shuen, A. 1997. “Dynamic capabilities and strategic management.” *Strategic Management Journal*, 18(7): 509-533.
- Verganti, R. 1999. “Planned Flexibility: Linking Anticipation and Reaction in Product Development Projects.” *Journal of Product Innovation Management*, 16: 363–376.
- Florice S. and R. Miller. 2001. “Strategizing for Anticipated Risks and Turbulence in Large-Scale Engineering Projects.” *International Journal of Project Management*, 19(8): 445-455.
- MacCormack, A., Verganti, R. and Iansiti M. 2001. “Developing Products on “Internet Time”: The Anatomy of a Flexible Development Process.” *Management Science*, 47(1): 133–150.
- Florice, S. and Ibanescu, M. 2008. “Using R&D portfolio management to deal with dynamic risk.” *R&D Management*, 38(5): 452-467.

Theme 13: Capturing the value produced by innovations

Capter la valeur produite par les innovations

- *Teece, D.J. 1986. "Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy." *Research Policy*, 15: 285–305.
- *Aldrich, H. E. and Fiol, C. M. 1994. "Fools rush in? The institutional context of industry creation." *Academy of Management Review*, 19(4): 645-670.
- *Rogers, E. M. 1995. *Diffusion of innovations (4th ed.)*. New York : Free Press. (particularly Chap. 1 and 6).
- Klepper, S. 1997. "Industry life cycles." *Industrial and Corporate Change*, 6(1): 145-181.
- *Shapiro, C. and Varian, H. R. 1999. *Information Rules*. Boston: Harvard Business School Press.
- Chesbrough, H. 2003. "The governance and performance of Xerox's technology spin-off companies." *Research Policy*, 32: 403–421.
- Vohora, A., Wright, M., and Lockett, A. 2004. "Critical junctures in the development of university high-tech spinout companies." *Research Policy*, 33(1): 147–175.