



Managing Knowledge Search and Ambidexterity
A PhD Course in Business Administration and Management

Bocconi University

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COURSE OBJECTIVES

This course exposes students to advanced topics in innovation and technology management, with emphasis on the learning literature and the exploration-exploitation framework.

The objectives of the course include:

- Provide students with the foundations of research on knowledge search and exploration-exploitation, while enhancing understanding of the key concepts.
- Understand the environmental, organizational, and behavioral antecedents and performance consequences of learning behaviors.
- Equip students with the conceptual frameworks and analytical approaches needed to critically review the literature and conduct research on the themes covered in the course.
- Expose students to a varied set of research methods that can be used in the study of topics in the field of innovation and technology management, while identifying their merits and limitations.

ABOUT THE INSTRUCTOR

Dovev Lavie is a Professor of Strategy in the Department of Management and Technology at Bocconi University. He earned his Ph.D. in Management at the Wharton School and served as an Assistant Professor at the University of Texas at Austin and a Full Professor and Vice Dean for MBA Programs at the Technion. He also held visiting positions at the London Business School, UCL and BI Norway. Lavie is a Sloan Industry Studies Fellow, a recipient of the Strategic Management Society's Emerging Scholar Award, and winner of the INFORMS TMS Best Dissertation Award and the Academy of Management Newman Award. His research interests include the evolution and performance implications of alliance portfolios, the balancing of exploration and exploitation, and applications of resource-based theory in interconnected technology-intensive industries. His work has been published in leading journals, such as the Strategic Management Journal, Academy of Management Review, Academy of Management Journal, and Organization Science. Lavie served as an Associate Editor of the Academy of Management Journal and the Strategic Management Journal and he is a member of the Strategic Management society Board of Directors. He has taught PhD courses, undergraduate courses, and Executive MBA courses and custom corporate programs focusing on exploration and exploitation, competitive strategy, corporate strategy, and cooperative strategy.

COURSE DESCRIPTION

This course covers advanced issues in innovation and technology management, focusing primarily on research on the phenomenon of exploration and exploitation at the organizational level. The course begins with the theoretical foundations of knowledge search and recombination, which are rooted in the learning literature and the behavioral theory of the firm. It focuses on the processes by which firms search for new knowledge and rely on their existing knowledge, identifying the organizational and behavioral constraints and drivers that shape that learning behavior. The framework of exploration and exploitation has built on these foundations to become central to the study of organizational learning, innovation, and performance. At the most basic level exploration entails generating new knowledge whereas exploitation involves refining and applying existing knowledge. Nevertheless, this framework has been extended to various other contexts and levels of analysis. The paradox of exploration and exploitation is that both activities are essential for performance but there are inherent tradeoffs that make it challenging for firms to maintain balance between them. In this course we will study the



alternative definitions, assumptions, and perspectives used in research on exploration and exploitation. We will identify the environmental and organizational antecedents that drive firms' tendencies to explore versus exploit. This will be followed by considering the consequences of exploration and exploitation, underscoring implications for organizational performance. Next, the emphasis will shift from exploration and exploitation within organizations to exploration and exploitation across organizations, acknowledging relevant research on interfirm alliances. Particular attention will be paid to the notion of balance between exploration and exploitation. We will assess alternative approaches for balancing exploration and exploitation and consider their performance implications. The course readings cover some fundamental contributions to the literature rather than the most recent articles, which can be read subsequently.

METHOD AND EXPECTATIONS

The course will be delivered in a seminar format, expecting students to be highly involved in discussion of the assigned articles. Students will be expected to demonstrate critical review skills and identify the contributions and limitations of the assigned articles. In the first two sessions, I will lead the discussion to cover the foundations and establish norms for analysis and contemplation. In the remaining sessions, students will take the lead and play a more proactive role. When reading the articles in preparation for class discussion, try to identify the motivation for the study; assess its positioning relative to prior research; understand the underlying logic behind the hypotheses; evaluate the research design including data, sample, operationalization of the variables, and analysis techniques; examine the validity and interpretation of the results; and consider the implications of the study and how it relates to other studies. When evaluating the set of articles assigned to a particular session, compare and contrast the studies, identify points of agreement and disagreement, and come up with ideas for how to integrate and reconcile them. Finally, think about ideas for future research that extend the research or build on its arguments. For each session, several lead questions have been listed. These are fundamental questions that should be considered in preparation for class discussion. Note that these are only suggested questions, while the discussion itself will be more extensive in scope and depth. Students are encouraged to prepare their own questions for class, including clarification questions about issues that were not straightforward in the articles and questions concerning their methodologies. Given the intensity of the course, students are advised to read the articles in advance and use the included review form for summarizing the main aspects of each article.

During sessions, I will offer some introductory remarks, following which each of the assigned articles will be discussed in turn. At the beginning, either I or one of the students assigned as a lead discussant of the article will offer a 10-minute presentation that provides an overview of the article. As a lead discussant, a student should provide copies of his or her presentation slides to all other participants in the session. The purpose of the presentation is mostly to make sure that everyone is on the same page. The presentation should highlight the motivation, theory, research design, results, and intended contributions of each article, with limited interpretation. Please reserve your reflections and synthesis to the subsequent class discussion. After each presentation, we will critically discuss the article. This will be followed by an overall discussion of the session's theme and conclusions from the set of assigned articles. During class discussion, feel comfortable to share thoughts and relate to other students' ideas. We seek to establish a supportive learning environment in which everyone feels free to share and exchange ideas. At the end of the session I may offer some concluding remarks that provide an integrative view of the theme.



COURSE ASSIGNMENTS AND GRADING

Course grading will be based on the following assignments and deliverables:

- 25% - Submission of 21 review forms for all the assigned articles. No need to submit review forms for the first three articles assigned to Session 1, the articles assigned to Session 2, and the *HBR* and *AMR* articles assigned to Sessions 6 (these articles are marked with “*”). The completed form is limited to 2 pages. These forms will not be graded. You will receive the full grade for submitting them. Please submit on Blackboard before the corresponding session.
- 50% - Lead discussant presentations. You will be assigned as a lead discussant of three articles (see Course Schedule and Reading Assignments). I will grade your presentation based on its delivery in class. Make sure you can deliver each presentation in 10 minutes. Please submit your presentation slides to me and to all other students on Blackboard prior to the corresponding session. Bring your presentation on a memory stick for backup.
- 25% - Contribution to class discussion. I will assess your contribution to class discussion following each session. Contribution is assessed based on quality rather than quantity. Dominating class discussion without offering meaningful contribution in the form of insights, integration, thoughtful questions etc., is discouraged. Listening and relating to others' ideas is a valid contribution. Nevertheless, unless you actively participate in the discussion, you cannot contribute.
- 25% - Optional Research proposal. You will identify an interesting research question and prepare a research proposal related to the topics discussed in the course. The proposal should include a brief but up-to-date literature review, identify the research gap, provide the motivation for the study, and offer hypotheses and preliminary theory to support the proposed framework. The proposal should conclude with a research design explaining how the theoretical framework can be tested empirically. The proposal is limited to 1500 words including references. It should be submitted on Blackboard two weeks after the conclusion of the course. If you decide to submit a research proposal for review the Lead discussant presentations will account for only 25% of your grade.



REVIEW FORM - EXAMPLE

Authors (Year)	Mitchell & Singh (1993)
Title	Death of the lethargic - effects of expansion into new technical subfields on performance in a firms base business
Abstract	This paper finds that industry incumbents that do not expand into new technical subfields tend to fare poorly in their established businesses, even if the market for the established products continues to exist. Firms that expand from their established businesses survive longer and achieve greater subsequent market share than competitors that do not expand. By some measures, however, a failed attempt to expand into a new subfield may be even more harmful to a base business than non-expansion. The study employs conventional and accelerated event-time regression models to analyze market share and survival. The sample, which includes 371 incumbents in four base subfields of the medical diagnostic imaging industry between 1953 and 1989, examines performance following the emergence of five new technical subfields of the industry.
Theoretical framework	Population ecology theory
Sample	371 incumbents in four base subfields of the medical diagnostic imaging industry (x-ray, nuclear, ultrasound, and CT) between 1953 and 1989, in the U.S. (100 of which expanded into emerging subfields, 81 exiting by acquisition and 106 by dissolution.)
Unit of analysis	Firms
Dependent variables [measures]	- Survival [the length of a firm's continued participation in the base subfield in number of years] - Performance [the subfield dollar revenue market share held by a pre-introduction incumbent during years 4, 8, and 16 after the emergence of the new subfield]
Independent variables [measures] + moderators	Exit [by dissolution or by acquisition]
Controls [measures]	Incumbent's prior subfield market share firm size [natural log of total corporate sales during the year before a new subfield emerged] nationality [0-1 indicator of firm majority ownership]
Definition of key construct	<i>[provide the definition of exploration-exploitation in the reviewed paper]</i>
Hypothesis	Hypothesis 1a. A pre-introduction incumbent that expands into the new subfield will have longer survival in its base subfield than firms that do not expand. Hypothesis 1b. A pre-introduction incumbent that expands into the new subfield will attain greater subsequent market share in its base subfield than firms that do not expand but survive. Hypothesis 2a. The greater the industry-wide market share held by a pre-introduction incumbent, the longer its continued survival in its base subfield. Etc.
Results	<ul style="list-style-type: none"> • Hypothesis 1a and 1b are supported • Hypothesis 2a partially supported, Hypothesis 2b supported • Hypothesis 3b supported for years 4 and 8 only • Hypothesis 4a supported, 4b supported and 4c not supported Etc.
Implications and Limitations	<i>[Here you should identify remaining research gaps, weaknesses of the paper, suggestions for improvement, implications of the study, and how it relates to other papers you have read]</i>



COURSE SCHEDULE AND READING ASSIGNMENTS

Session 1 – February 9 10:30-14:00

Topic: Knowledge Search and Recombination

Reading Assignments:

- *Kogut, B., Zander, U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* 3(3): 383-397.
- *Stuart, T., & Podolny, J. M. 1996. Local search and the evolution of technological capabilities. *Strategic Management Journal*, 17 (Special issue): 21-38.
- *Gavetti, G., and D. Levinthal. 2000. "Looking Forward and Looking Backward: Cognitive and Experiential Search." *Administrative Science Quarterly* 45(1): 113-137.
- Fleming, L. 2001. Recombinant uncertainty in technological search. *Management Science*, 47: 117-132.
- Rosenkopf L, Nerkar A. 2001. Beyond local search: Boundary-spanning, exploration, and impact in the optical disk industry. *Strategic Management Journal*, 22: 287-306.
- Katila, R., Ahuja, G. 2002. Something old, something new: A longitudinal study of search behavior and new product introduction. *Academy of Management Journal*, 45(6): 1183-1194.
- Chen, W. R. 2008. Determinants of firms' backward- and forward-looking R&D search behavior. *Organization Science*, 19(4): 609–622.

Discussion Questions:

1. Where does new knowledge come from?
2. How do firms search for new knowledge?
3. What bounds a firm to search locally?
4. How can the firm overcome these constraints and span boundaries?
5. Along what dimensions do firms search for knowledge?
6. What determines whether search is forward- or backward-looking?

Session 2 – February 16 10:30-14:00

Topic: Foundations of Exploration and Exploitation

Reading Assignments:

- *March, J. G. 1991. Exploration and exploitation in organizational learning. *Organization Science*, 2: 71-87.
- *Levinthal, D. A., & March, J. G. 1993. The myopia of learning. *Strategic Management Journal*, 14 (special issue): 95-112.
- *Gupta, A. K., Smith, K. G., & Shalley, C. E. 2006. The interplay between exploration and exploitation. *Academy of Management Journal*, 49: 693-706.
- *Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. 2009. Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. *Organization Science*, 20(4), 685–695.
- *Lavie, D., Stettner, U. & Tushman, M. 2010. Exploration and Exploitation within and across Organizations, *Academy of Management Annals*, Vol 4, 109-155.
- *Wilden, R, Hohberger, J., Devinney, T.M., & Lavie, D. 2018. Revisiting James March (1991): Whither exploration and exploitation?, *Strategic Organization*, 16(3), 352-369.



Discussion Questions:

1. How should we define “exploration” and “exploitation”?
2. Are exploration and exploitation independent or interdependent?
3. Are exploration and exploitation complementary or contradictory activities?
4. Should firms pursue both exploration and exploitation or specialize only in one activity?
5. How should firms effectively engage in both exploration and exploitation?

Session 3 – February 23 10:30-14:00

Topic: Antecedents of Exploration and Exploitation

Reading Assignments:

Nohria, N., & Gulati, R. 1996. Is slack good or bad for innovation? *Academy of Management Journal*, 39(5), 1245–1264

Sidhu, J.S., Volberda, H.W., & Commandeur, H.R. 2004. Exploring exploration orientation and its determinants: Some empirical evidence. *Journal of Management Studies*, 41(6), 913–932.

Jansen, J.J.P., Van den Bosch, F.A.J., & Volberda, H.W. 2006. Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661–1674.

Voss, G.B., Sirdeshmukh, D., & Voss, Z.G. 2008. The effects of slack resources and environmental threat on products exploration exploitation. *Academy of Management Journal*, 51(1), 147–164.

Discussion Questions:

1. What motivates firms’ efforts to explore and exploit?
2. How do environmental factors drive exploration and exploitation?
3. How do organizational factors affect exploration and exploitation?
4. What are some boundary conditions to the antecedents identified in the literature?
5. What drives firms toward balance versus imbalance of these activities?

Session 4 – March 2 10:30-14:00

Topic: Consequences of Exploration and Exploitation

Reading Assignments:

Auh, S., & Menguc, B. 2005. Balancing exploration and exploitation: The moderating role of competitive intensity. *Journal of Business Research*, 58(12), 1652–1661

Siggelkow, N., & Rivkin, J. 2006. When exploration backfires: Unintended consequences of multilevel organizational search. *Academy of Management Journal*, 49(4), 779–795.

He, Z.L., & Wong, P.K. 2004. Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481–494.

Jansen, J.J.P., Simsek, Z. & Cao, Q. 2012. Ambidexterity and Performance in Multi-unit Contexts: Cross-level Moderating Effects of Structural and Resource Attributes. *Strategic Management Journal*, 33(11), 1286-1303.



Discussion Questions:

1. How do the consequences of exploration and exploitation differ?
2. Do the consequences of exploration depend on exploitation or vice versa?
3. Under what conditions can a firm maximize the effects of exploration and exploitation?
4. How does balancing exploration and exploitation maximize performance?

Session 5 – March 9 10:30-14:00

Topic: Exploration and Exploitation at the Inter-organizational Level

- Koza, M. P., A. Y. Lewin. 1998. The co-evolution of strategic alliances. *Organization Science*. 9(3) 255–264.
- Rothaermel, F. T., & Deeds, D. L. 2004. Exploration and exploitation alliances in biotechnology: A system of new product development. *Strategic Management Journal*, 25 (3): 201-221.
- Lavie, D., & Rosenkopf, L. 2006. Balancing exploration and exploitation in alliance formation. *Academy of Management Journal*, 49(4), 797–818.
- Lavie, Dovev, Kang, Jingoo & Rosenkopf, Lori. 2011. Balance within and across Domains: The performance Implications of Exploration and Exploitation in Alliances. *Organization Science*, 22(6), 1517-1538.
- Lin, Z., H. Yang, I. Demirkan. 2007. The performance consequences of ambidexterity in strategic alliance formations: Empirical investigation and computational theorizing. *Management Science*. 53(10) 1645–1658.

Discussion Questions:

1. How can one define exploration and exploitation in alliances?
2. What drives firms' tendencies to explore versus exploit in alliances?
2. How should firms balance exploration and exploitation in alliances?
3. Should alliances complement or substitute internal efforts for exploration and exploitation?

Session 6 – March 16 10:30-14:00

Topic: Balancing Exploration and Exploitation

- Gibson, C.B., & Birkinshaw, J. 2004. The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47(2), 209–226.
- *O'Reilly, C. A., Tushman M.L., 2004. The Ambidextrous Organization. *Harvard Business Review* 82 (4), 74–81.
- *Benner, M. J. and Tushman M.L., 2003. Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, 28: 238-256.
- Brown, S.L. & 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), 1–34.



Kang, J. & Kim, S-J. 2020. Performance implications of incremental transition and discontinuous jump between exploration and exploitation *Strategic Management Journal*, 33(11), 1286-1303.
(Guest Presentation – Jingoo Kang)

Stettner, U. & Lavie, D. 2014. Ambidexterity under scrutiny: Exploration and exploitation via internal organization, alliances, and acquisitions", *Strategic Management Journal*, 35(13), 1903-1929.
(Guest Presentation – Uriel Stettner)

Discussion Questions:

1. What does balance between exploration and exploitation mean? How can we measure it?
2. What are the assumptions of alternative approaches for balancing exploration and exploitation?
3. In what dimensions do these approaches differ?
4. Are these alternative or complementary approaches for maintaining balance?
5. What skills and techniques can firms adopt to effectively balance exploration and exploitation?