MHR 7461
Technology Strategy & Innovation Management
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Class: Mon. & Weds. 8:30 – 10:00. Gerlach 315.	**Office Hours**: By Appointment

Technology Strategy & Innovation Management provides students with a strategic perspective on management in complex, knowledge-intensive, and dynamic environments. These settings pose a different set of challenges to the identification and pursuit of competitive advantage than described in your core courses. Although tradeoffs between different resource allocation policies and forms of organization remain critical, the emphasis is now on whether and when to shift from an old to new sources of advantage.

The course is organized around three questions and three instructional modules:

Creating Value: Patterns of Change in Technologies & Markets. This module examines how changes in the structure of markets create opportunities for new value creation. The main idea is that changes in consumer preferences, knowledge and technology, and regulation create imbalances that are amenable to new organizational solutions. The primary objectives of this module are to introduce methods to identify emerging opportunities and to evaluate investment proposals in ambiguous and uncertain environments. [1]

Capturing Value: Profiting from innovation in the market for ideas. The second module explores the factors that determine the fraction of value created that flows to the innovator or innovating firm. This module recognizes that economic value is almost always created through the coordinated action of a group of firms and that different mechanisms are required to capture value from ordinary (physical) property and intangible (knowledge) assets. The primary objective of the module is to explore how the use of patents, complementary assets, standards, lead-time, and related mechanisms influence the value captured by the innovating firm.

Delivering Value: Identifying innovative ideas & building an innovation competence. The final module examines how managers assemble and organize resources to deliver value in dynamic settings. This module describes the challenges of designing organizations to effectively explore new value creating opportunities, the conflicts that occur between the "core" business and "innovative efforts", as well as the resource allocation and organizational mechanisms managers may use to mitigate these challenges. In sum, the module emphasizes the tradeoffs managers face when designing organizations to innovate.

This course is designed to illustrate the interactions between competitive strategy and patterns of technological, market, and competitive change. The pedagogical approach taken in *Technology Strategy & Innovation Management* involves a mixture of readings, case analyses, discussions, and simulation workshops. The bulk of the course is based on a series case studies and discussions that allow students to apply these tools. When correctly applied, these models provide a means to consider which firms will benefit from technology or market change, why many existing firms fail to incorporate new technology, and the types of technologies and markets in which a given firm should invest.

I created the original version of *Technology Strategy & Innovation Management* in 2005 to help students identify high-quality management theory and consider how it may help them understand the factors that dynamically affect competition. I've since been invited to deliver elements of the course to students and clients throughout the US and Europe. The course is likely to be of particular interest to students interested in creating, managing, or consulting to organizations active in complex, knowledge-intensive, and dynamic settings. Students with interests in design, engineering, science, and public policy may also find the course rewarding.

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[1] Please note the distinction between efforts to search for new ideas and efforts to evaluate these ideas.

Course Requirement and Grading

Required Materials:

- Readings marked "DOWNLOAD" are available at no charge through the OSU library system. To download these articles, navigate to http://library.osu.edu/, click the "research database" quicklink and search for the "Business Source Complete" tool. If you are accessing the site from an off campus location you will need to provide your "name.number" OSU email username and password. Once you've found the Business Source Complete database you may search and download PDF files.
- Cases and Readings may be purchased through the Harvard Business Publishing Clearinghouse. This information may be accessed at http://cb.hbsp.harvard.edu/cbmp/access/57388715. Upon registering you will be prompted to enter a payment for these course materials.
- A book marked PURCHASE is also used in the course and available on Amazon.com at $14.70. http://www.amazon.com/How-Stella-Saved-Farm-Innovation/dp/1250002125. The reference is: Govindarajan, VJ and C. Trimble. 2013. How Stella Saved the Farm. St. Martin's Press.

Popular Textbooks in Technology Strategy & Innovation Management:

1. Afuah, Allan. 1998. Innovation Management: Strategies, Implementation, and Profits. Oxford University Press. New York, N.Y.
2. Burgelman, R., Christensen, C., Wheelwright, S. 2004. Strategic Management of Technology and Innovation. Irwin-McGraw Hill.
3. Leiblein, M.J. and A. Ziedonis. 2011. Technology Strategy & Innovation Management, Edward Elgar Publishing.
4. Schilling, M. 2005. Strategic Management of Technological Innovation, Boston: McGraw Hill.
5. Tushman, M. & P. Anderson. 1997. Managing Strategic Innovation & Change, Oxford University Press, New York, N.Y.

Instructional Procedure:
This course will be taught in discussion format using a mixture of readings, short lectures, and cases. The assigned readings provide background conceptual material for each session. The cases contain information on the objective of the activity, the people involved, and a series of events and administrative difficulties that confront the responsible executive. The intent of case analysis is to provide you with the opportunity to make complex decisions with limited information and to sort through data that is available to a decision-maker, some of which may be superfluous. In preparing cases, the following guidelines may be helpful: (1) recognize that the data in a case are invariably incomplete, (2) do not overlook the data that are available, (3) if an essential piece of data is missing, make reasonable and explicit assumptions, and (4) believe the facts and data in a case, but be suspicious of stated opinions. You are not required to obtain data from other sources to analyze cases in this class.

Attendance:
The primary source of your learning in this course will take place in the classroom as you and your colleagues share your insights and debate alternative courses of action available to the actors presented in the case. Although the assigned readings provide background material, attending class is necessary for a satisfactory evaluation on the contribution component of the final grade. The class will start promptly on time and will run for the entire session. Arriving late or leaving early disrupts the class and lessens your contribution; please do so only when absolutely necessary.

Technology:
The use of computers is not allowed in class. While I see benefits to their use, I have found that their use often distracts from the learning experience. I ask that you refrain from using laptops and smartphones in this class.

Academic Integrity:
Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct. If I suspect that a student has committed academic misconduct in this course, I am obligated to report my suspicions to the Committee on Academic Misconduct (COAM).

Students enrolled in the course are expected to further adhere to the Fisher College honor code. In part, the honor code asks that students agree: (1) not to discuss a case or receive notes on a case that has not yet been discussed in class and (2) that written case assignments reflect you or your team members' effort. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Evaluation:
The grading plan describes the relative importance attached to each of the individual activities used to assign a course grade. Your **course grade** will reflect your performance in terms of **(1) class contribution (35%), (2)** a sequence of **group two page papers (30%), and (3) a final exam (35%).** Details on each of the grade components are provided below.

Class Contribution:
Class contribution is one of the best and most reliable ways that students can demonstrate their understanding of the ideas presented in class and their ability to apply these models to real business situations. In-depth case preparation and active class contribution are also excellent ways to prepare for the final exam. This is your course in the fullest sense—what each person takes away from the course is a direct function of the effort that they and the rest of the group put forth in the debate. I'll provide extra credit for a single day if you send me an email with the phrase I've read the syllabus to receive in the subject line. The class contribution grade is composed of an overall (1) evaluation by the professor and (2) peer evaluations of instruction.

Professor Evaluation. For each class session, the professor will have a list of questions that help to identify the issues underlying the discussed business problem or issue. These questions may or may not correspond to the study questions that are provided for the day. The professor will call on students to answer each of these questions and take notes on students' contributions to the class session. While it is desired to rely on voluntary contribution, the professor may call upon you at any time, whether to open the case discussion with a summary of the key issues, to discuss the required readings, or to answer a specific question on a case. It is assumed that all students have completed the assignments and are prepared to discuss them thoughtfully in class. *If for some reason you are not prepared for the discussion, please signal this by placing your name card FACE DOWN*. If your name card is not up, the professor will assume you are unprepared and make a note of that for your class contribution grade.

The following criteria will be used to judge class contribution. **Excellent class contribution** demonstrates that the student has thought deeply about the issue or case and can develop creative and innovative insights through this analytic effort. Excellent contributions often evaluate and synthesize course material and contribute to others comments by keeping the discussion focused and /or suggesting alternative ways of approaching the material. *Excellent contributions can be the basis of class discussion for 20 minutes or more*. **Good class contribution** entails providing effective answers to case and discussion questions. Effective answers indicate that the student is able to interpret case and reading

material in a manner that generates relevant implications. Good class contribution further indicates that the student is actively listening to others, able to question others in a constructive way, and able to provide comments relevant to the ongoing discussion. Good class contribution adds to our understanding of the underlying conceptual material, challenges and clarifies the ideas expressed by others, integrates material from past classes or other courses, and shows evidence of analysis or interpretation of facts rather than mere opinion. **Fair class contribution** entails being present in class but offering straightforward information on basic facts presented in a reading or case. **Poor class contribution** entails being absent from class or checking email or texting while attending class. Students may earn additional contribution points by identifying articles from the academic and/or popular press (e.g., WSJ, Economist, Business Week) that illustrate a concept used in class.

Peer Evaluation. Attached to your syllabus is a *Peer Class Contribution Evaluation Form*. Each student will be asked to list on this form ***up to four people*** in the class who, in their opinion, demonstrated excellent class contribution throughout the quarter. Students may not list themselves on this form. Although student evaluations will be kept confidential, for accounting purposes, each student will need to sign their *Peer Class Contribution Evaluation Form*. The *Peer Class Contribution Evaluation Form* must be returned to the Professor no later than the end of class on the **last day of the course**. Students who fail to turn this form in on time will not receive the highest class-contribution grade.

"2 Pagers":

Students should form their own groups of four or five individuals. Any student not included in a group after the second session will be assigned to a group by the professor.

Each group will be required to write a series of very brief (no more than two pages) papers. These "2-pagers" should **illustrate the application of one or more of the frameworks developed during the previous module** to an industry and/or firm of your choice. All the papers should be about the same industry or firm—teams are welcome to submit a one paragraph description of the company and potential issues that you will examine in the course prior to session 3. The 2-page papers should use 1" margins, 1 and ½ line spacing, and 12 pt font size. The assignments will be graded on a check-plus, check, check-minus system and assessed in terms of the evidence that each team provides indicating that they have: (a) considered the primary questions outlined in the module, (b) determined which conceptual perspective is most pertinent to the situation described in their industry, and (c) can apply insights from that perspective based on the evidence that they have regarding the situation that they are examining.

Assignment 1 (Please upload a copy to the Carmen dropbox as indicated above): The objective of this assignment is to help you consider new sources of value by evaluating how changes in technology, consumer preferences, or (in some cases) regulatory constraints affect competition. The assignment specifically asks you to consider the mechanisms that underlie technology S-curves and product diffusion curves. While teams are asked to sketch these curves, the bulk of your effort should be placed on describing what you found and explaining why (or why not) the data fits the theory. For instance, it may be helpful to consider how effort is related to technical performance in your setting, whether technical performance is subject to "natural technological limits," and whether this area has or is likely to experience a "disruption." It is important to choose your industry wisely so that you can write about this area in later assignments. The most appropriate industries are those in which you can (1) access information on the performance of a particular innovation or family of innovations over time, (2) access information about the resources that created the innovation and how they were organized & (3) describe the organization structure used by at least one firm to create the innovation.

Assignment 2 (Please upload a copy to the Carmen dropbox as indicated above): This exercise provides an opportunity to consider whether and how a firm captures value from one of its significant

innovations. The assignment asks you to identify a specific recent innovation commercialized by a firm in your industry and to describe actions the innovating firm should take to capture value from this innovation. The innovation could be embedded in a product or service or be organizational in nature. To complete this assignment, please briefly describe the innovation, explain whether and why you believe that mechanisms such as patents, technical know-how, complementary assets, etc. are (or are not) likely to protect the firm's IP, and evaluate the innovating firm's ability to capture value from this innovation.

Team Evaluation: In general, each team member will receive the same grade on all team assignments. Unfortunately, there may be times when one or more members of a group "free ride" on the work of others. The grades of such free riders will be substantially reduced if consistent evidence of free riding is found. To discover free riding, each team member is provided the **opportunity** to submit an individual team evaluation form on the **due date for each team assignment**. An example team evaluation form is included with this syllabus. If you do not submit a team evaluation form for a particular assignment, I will assume that, from your perspective, no free riding problems existed.

Final Exam:

The final exam will be a written analysis of a case or a series of newspaper articles. The final exam must be completed independently. Responses to exam questions will be due at the conclusion of the university scheduled final exam period. The exam will be evaluated in terms of the following general criteria.

> *Excellent* exam answers demonstrate both a student's understanding of the theories and models discussed in class and in the readings as well as a student's ability to apply these theories and models to generate insights about real business situations facing firms.
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> *Good* exam answers demonstrate either that a student understands the theories and models ***or*** that a student can generate insights about a real business situation facing firms, but not both.
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> *Poor* exam answers demonstrate neither an understanding of the theories and models nor an ability to generate insights about real business situations facing firms.

Grade Appeals:

Grades on exams and assignments are intended to reflect the overall quality of performance of the student. You may appeal your grade on any particular course assignment or exam. To appeal a grade, submit a clear written explanation describing why you believe the assigned grade is inappropriate within one week after your work is returned. I will carefully consider all such appeals. I will not re-grade an individual question or portion of an assignment; rather I will re-grade the entire assignment. As a result, the final grade for the re-graded assignment may be greater than, less than, or equal to the original grade.

Suggestions:

If you have special inquiries or constructive suggestions concerning the progress of the class, please feel free contact me in my office (Fisher 848), via phone (292-0071), or via email (leiblein.1@osu.edu) at any time.

About Your Instructor
Michael J. Leiblein, Ph.D.

At the Fisher College of Business, Leiblein teaches the Technology Strategy, Advanced Strategic Analysis, and the Innovation Field Study MBA elective courses as well as PhD seminars in competitive strategy and innovation. He has previously taught the MBA business core and MBA corporate core strategy courses, electives on corporate strategy and strategy consulting, and a variety of executive and PhD level courses. He has won multiple outstanding core course instructor awards, led masters, executive, and PhD level seminars in the US and Europe for academic and non-academic institutions, and been invited to be a strategy and innovation subject matter expert for the *Accenture Academy*.

At Ohio State, Leiblein serves as a co-director for OSU's multidisciplinary *Food Innovation Center*, as a founding member and academic director of the *OSU Center for Innovation*, and as the academic director of OSU's *Integrated Business and Engineering Program*. He previously served on the inaugural TechColumbus Innovate Columbus committee where he helped develop the Innovation Summit (2009 through 2012). More recently, he helped organize and presented work at the OSU YPO-WPO innovation program (2015), co-organized an innovation summit with Cherry Bekaert, the National Center for the Middle Market, and the Strategic Management Society (2015), and co-developed the OSU@CERN TransAtlantic Innovation program (2016). He has consulted in the United States, Europe, and Asia for a variety of organizations and associations.

Michael's academic research focuses on the relationship between organizational form and firm performance in technology-intensive industries. His work has been published in leading academic journals such as the *Strategic Management Journal,* the *Academy of Management Journal,* the *Journal of Industrial Economics,* the *Journal of Management, and* the *Journal of Management Studies* and has received international media coverage in outlets such as *The Financial Times* (London), *Les Echos, Red Herring,* and *USA Today*.

Michael's research has also been recognized with several academic research awards from the Academy of Management, Academy of International Business, and Strategic Management Society. His dissertation research on the adoption of new technologies was recognized by the Academy of Management as one of the best dissertations in the field of strategic management (1997 Free Press Award). He is the primary investigatory on a National Science Foundation grant that extends his prior work on the causes and innovative consequences of organizational decisions in the global semiconductor industry and has received multiple grants from the General Electric National Center for the Middle Market to explore effective innovation practices across different sized firms and to compare the effectiveness of various "open innovation" practices.

Michael serves as member of several prestigious editorial boards including the *Strategic Management Journal* (since 2004), the leading academic journal in the field of strategic management, the *Academy of Management Review* (since 2005), as an inaugural editorial board member for *Strategy Science* (since 2014), and as an advisory panelist for the *National Science Foundation* (since 2011). In addition, he has served as an associate editor (2008 through 2011) at the *Journal of Management*, as an editorial board member of the *Journal of Management* (2002 through 2007), the *Academy of Management Review* (since 2005), and the *Academy of Management Journal* (since 2016), as a member of the executive committee for the *Business Policy & Strategy* division of the Academy of Management, and as an officer of the *Competitive Strategy division* of the *Strategic Management Society*.

Michael received his Ph.D. from Purdue University and his M.B.A. and a B.S. in Electrical Engineering from Rensselaer Polytechnic Institute. Prior to his doctoral studies, he worked as a consultant for Andersen Consulting (Accenture) and as an engineer for Johnson Controls. In his free time, Michael enjoys attending collegiate sporting events, opera, and hiking through New England and the American Southwest.