

The Marshall School of Business
University of Southern California
Los Angeles, CA 90089-0808



MOR561
Strategies in High Technology Businesses
Fall, 2007

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Course Overview

Why are some firms more successful in exploiting product or process technology than others are? How can general managers who are not technologists or who are currently not up to date with their technology compete with, build competencies in, or make resource allocation decisions for technologies that they do not understand? How well do traditional general management approaches such as value-based management or market research work in technical organizations engaged in global competition? How can general managers build and retain technical competencies during tough economic times? How can general managers avoid ethical and legal problems in dealing with new and uncertain technologies? These and similar questions pose special concerns for general managers in technically based organizations and are some of the issues addressed in this course.

This course is intended to help Marshall MBA graduates prepare to lead their firms in exploiting the competitive potential of technology, regardless of the industry they enter or the functional specialization they pursue, by examining the central issues in the strategic management of technology. The course is organized into three modules that begin with developing internal core technological competencies and then proceeds to accessing the technological competencies of others, and finally the unique aspects of developing and executing technology based strategies within the larger social context.

Course Structure

The three interlocking modules are organized within the 15 weeks of the course as follows:

Week 1: Introduction/Formulating Technology Strategy

During the first half of the first session, we survey the overall course framework and requirements. The second half of the first session covers a discussion of the case of Polaroid's entry into digital imaging. This case provides a vehicle for introducing many of the topics we will cover in greater depth throughout the course such as developing internal technical competencies, leveraging the capabilities of others, competing with technology, and leading technical organizations.

Weeks 2 - 7: Module I – Creating Value

This module deals with how technological competencies are developed internally and through alliances, how firms take advantage of radical and incremental technological change, and how to link innovation to strategy. We use the Sharp-Xerox OEM alliance to explore how firms develop and maintain long-term relationships in the threat of global competition. Next we examine how Chaparral Steel develops and sustains its technological leadership in mini-mill steel production. Then we examine how firms try to use disruptive technology to enter new industries and how incumbents respond in the small camera and electronic equipment test industries. Finally, in the Corning case we examine how firms improve their product development speed.

Week 8

During Week 8 we have a mid-term exam for those who choose to take the exam rather than the term project option (see later discussion in this syllabus) and the information on the format and evaluation criteria posted in Blackboard.

Weeks 9 - 12: Module II – Capturing Value

This module deals with protecting intellectual property through both legal means such as patents and non-legal means such as erecting barriers to imitation. We examine issues of how firms try to retain their intellectual property in semiconductors with the Rambus case and cellular telecommunications with QUALCOM. Finally, we examine how firms capture value with design with the BMW AG: Digital Car case and a field trip (date TBD) to BMWDesignworks.

Weeks 13 – 15: Module III – Delivering Value

This module focuses on deploying strategy through internal diversification. We focus on comprehensive or synoptic diversification and incremental diversification in the satellite communication industry with Iridium and Space Data.

Course Requirements

Materials

The course packet contains the cases and some of the supplementary readings and is noted as “Readings” in the assignments. The remaining readings are contained in, Managing Strategic Innovation and Change, 2nd Edition, by Tushman and Anderson and is noted as “Book” in the assignments. Both the readings package and the book are available through the University Bookstore.

Grading

There are three graded components of the course:

- | | |
|-----------------------------------|-----|
| 1. Participation | 10% |
| 2. Written analysis of case (WAC) | 30% |
| 3. Term project | 60% |

OR

- | | |
|---|-----|
| 3. Exam option (both a mid-term - 20% and final exam - 40%) | 60% |
|---|-----|

Retention of Graded Work: In accordance with the Marshall Instructional Guide and Procedures Handbook, Fall 1997, “returned paperwork, unclaimed by a student, will be discarded after 4 weeks and, hence, will not be available should a grade appeal be pursued by a student following receipt of his/her final grade.”

Participation

In a case-based course preparation and participation are critical. Consequently, 10% of your grade will depend on these elements, which are evaluated in two ways.

First, your voluntary participation in class sessions is of signal importance. As usual, quantity without quality is meaningless; the fundamental criterion is the extent to which your contributions advance the learning of all. Outstanding students display mastery of cases and readings, provide original and penetrating insight into the class of problems they represent, and are able in real-time to build upon and link the contributions of their classmates to the current discussion and the cumulative learning from the course. Appendix A is attached which lists participation behaviors and the range of scores associated with each. I will ask that after the first session that you sit in the same seat and bring and be certain that your name card is readable from the front of the class.

Second, you will be asked to designate two case sessions during which you will assume specific responsibility for stimulating the discussion. You will be asked to read any written analyses of the case prepared by your classmates and sent to you the day before the session and prepare to compare and contrast your views with theirs during the class discussion. You will need to e-mail me your individual choices by Monday of the second week of classes.

Written analysis of case

30% of your grade will depend on three written analyses of cases (WAC). For every case, you will be asked to articulate a framework that describes your general approach to a class of problems, and then applies your insights to the specific case. Because analytical frameworks are so central to this class, a note on frameworks is assigned for the first session. WACs may not exceed six double-spaced typewritten pages, excluding figures and references.

WAC's are to be prepared by your study group. You will be asked at the beginning of the term to form yourselves into case study groups of anywhere between one and four members. Study groups are expected to remain together the entire term; movement among groups will be permitted only in extraordinary circumstances.

Your study group may choose the sessions for which you wish to submit these case write-ups on a first-come, first-served basis. Once the class enrollment is set, students will be allowed to sign up for any of the case¹ sessions as long as openings remain available. Minimums of two groups are required for each of the 12 sessions for which WAC's are available before additional teams may sign-up. The maximum will vary by the total number of students enrolled (e.g., 20 students there will be a maximum of two WAC's for any case. The later you sign up for your WAC, the

¹ No WACs will be written for sessions marked in the syllabus with an asterisk. There are a total of two such sessions and hence, only 12 available for WACs.

fewer choices will remain open to you. These WACs must be e-mailed to me and to the individuals with session discussion responsibility (see discussion above) by 12 p.m. the day before the session being analyzed. Late WAC's will be downgraded by one grade.

At the end of the term you will be asked to complete a peer evaluation of your study group members to avoid the problem of free-riders (Appendix C).

For the other 60% of your grade, you may choose between a term project **or** a mid-term and final examination.

Term Project Option

This is a paper relating an aspect of the course to a practical managerial problem. You may choose to write a paper alone or as part of a group of no more than three; no person can belong to more than one term project group. If you select this option, the names of group members must be submitted at the end of session 8. This selection is irrevocable, so ensure that every member of the group is comfortable with the contributions each member is expected to make.

You can undertake one of two types of projects. One is a field project, essentially a consulting assignment that applies know-how developed in this course to a real-time problem faced by an actual manager. I will be happy to work with you to identify your interests and help you find companies within an easy drive of Los Angeles that might be suitable candidates. Alternatively, you may wish to develop your own field site; if so, I will provide help gaining access to the site if requested. There are only two restrictions on the field site: 1) you may not rehash your summer jobs (although you may take on an entirely new project for people you worked with during the summer); 2) **I must approve the project proposal before it is finalized.** Please consult with me before approaching a potential field site, to ensure that the project you have in mind falls within the domain of the course. If you choose a field project, you must produce a signed agreement between you and a specific client at the field site specifying what you are to deliver to him/her (usually a report) and the deadline by which you will deliver it, which must fall before the end of the term. The client's written evaluation of your work is one of the factors that will contribute to your grade. If you choose this option, you will need to produce the report, a VHS videotape of your presentation to the client, and ask them to fax their evaluation of your performance NLT Friday, November 30th.

Alternatively, you may develop a case using library sources and field interviews. Such a case should be suitable for use in this elective, either as a substitute for one of this term's cases, or as a problem that cuts across and integrates several of the topics we address this term, or as an analysis that builds insights into areas related to this course but which we do not explicitly address this term. Please consult with me before finalizing your topic to ensure that the project you have in mind falls within the domain of the course. Again, I will help you gain access for field interviews (by phone or visit) if requested. Your case should include a separate analysis, which highlights the lessons you would draw from it. Should you write a case, you need written permission from each person you interview to attribute quotations to them; they must understand that your case will become property of the Marshall School and may be distributed publicly.

If you choose the term project option, please confirm the topic with me by the end of session 6. If you are doing a field project, you must have a signed agreement (Appendix B) with the client at that time.

Papers are due by 12 p.m., Friday, November 30th; and should be submitted through Blackboard's Turnitin feature (see below). Late submissions will be marked down one letter grade.

Examination Option

You may elect to take a mid-term **and** a final examination instead of undertaking a term project. These will be in-class examinations based on a case with supplemental essay questions covering course materials. The entire examination is open-note, open-book but your answers are expected to be your effort and not that of any others. You may use any aids you wish (e.g. calculator, computer) but the exam must be prepared on a computer and submitted through the Turnitin system of Blackboard (see below). Both the mid-term and final are two part exams. The first part will ask you to submit your personal framework for integrating the course material (see the article on frameworks for the first session). The second part of the exam will ask you to apply this framework in answering a set of questions based on a representative case distributed a week before the exam. You may take the exam remotely by signing up beforehand or taking the exam in class. In either case, you should submit your answers in electronic form through Blackboard's Turnitin system.

The remote exam procedure is for you to take the exam at the same time and date as the scheduled exam (regardless of your location and time-zone) by first sending me an e-mail message that you are on-line and standing by a few minutes before the scheduled start of the exam. After first passing out the exams to those physically present in the classroom, I will send you the questions electronically by attaching them to your e-mail message. You will then have the same time as those students who are physically present in the classroom for the exam.

In considering whether or not to do a term project or the examination option here are several features of each to consider. The examination option will provide you with more concrete feedback earlier in the course than the term project. Therefore, if you are concerned about receiving timely feedback on how well you are doing, you should choose the examination rather than the term project option. For example, those choosing the term project option will only know how they scored on 30% (3 WAC's) of the course until the course is over while those choosing the examination option will know how they scored on 50% of the course before it is over. However, unless everyone chooses the examination option, it will not be possible to know how you compare to the rest of the class for grading purposes because some of you will have 30% of your total points while others will have 50% (3 WAC's + Mid-Term) before the final exam or project is due.

If you are not concerned about receiving feedback on grade standing and are more interested in digging in and helping a real organization with an interesting problem or exploring a topic that others could learn from, then the term project option is probably preferable.

The amount of effort and course learning for either the term project or the exam should be comparable.

You must select either the term project or the examination option by the 6th week.

Please note that if your individual performance in the course is unsatisfactory, it will not be brought up by a good group grade.

Course administration

Office Hours

With rare exceptions announced in advance, I will be available from 5:00-6:00 p.m. Wednesdays in the food court of Popovich Hall. If you need to meet with me outside these hours, please e-mail me to set up an appointment.

Attendance

Since this class relies so heavily on participation, your attendance at each session is quite important. Please notify the Student Affairs office or me as soon as possible by any means available if you are unable to attend a session due to illness, family emergency, or an *unavoidable* conflict. In case of an unavoidable conflict, you will be required to hand in *before* class a three-page analysis of the case assigned for the session you miss. Unexcused absences from class will have a serious negative impact on your participation grade; no compensatory work will be permitted to make up for an unexcused absence

Academic Integrity

The following information on academic integrity, dishonesty, and the grading standard are placed here at the recommendation of the Marshall School of Business Faculty and are taken from the Faculty Handbook.

“The University, as an instrument of learning, is predicated on the existence of an environment of integrity. As members of the academic community, faculty, students, and administrative officials share the responsibility for maintaining this environment. Faculty have the primary responsibility for establishing and maintaining an atmosphere and attitude of academic integrity such that the enterprise may flourish in an open and honest way. Students share this responsibility for maintaining standards of academic performance and classroom behavior conducive to the learning process. Administrative officials are responsible for the establishment and maintenance of procedures to support and enforce those academic standards. Thus, the entire University community bears the responsibility for maintaining an environment of integrity and for taking appropriate action to sanction individuals involved in any violation. When there is

a clear indication that such individuals are unwilling or unable to support these standards, they should not be allowed to remain in the University.” (Faculty Handbook, 1994: 20)

Academic dishonesty includes: (Faculty Handbook, 1994: 21-22)

1. Examination behavior - any use of external assistance during an examination shall be considered academically dishonest unless expressly permitted by the teacher.
2. Fabrication - any intentional falsification or invention of data or citation in an academic exercise will be considered a violation of academic integrity.
3. Plagiarism - the appropriation and subsequent passing off of another's ideas or words as one's own. If the words or ideas of another are used, acknowledgment of the original source must be made through recognized referencing practices.
4. Other Types of Academic Dishonesty - submitting a paper written by or obtained from another, using a paper or essay in more than one class without the teacher's express permission, obtaining a copy of an examination in advance without the knowledge and consent of the teacher, changing academic records outside of normal procedures and/or petitions, using another person to complete homework assignments or take-home exams without the knowledge or consent of the teacher.

Turnitin

USC is committed to the general principles of academic honesty that include and incorporate the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using other's work as one's own. By taking this course, students are expected to understand and abide by these principles.

All submitted work for this course may be subject to an originality review as performed by Turnitin technologies (<http://www.turnitin.com>) to find textual similarities with other internet content or previously submitted student work. Students of this course retain the copyright of their own original work, and Turnitin is not permitted to use student-submitted work for any other purpose than (a) performing an originality review of the work, and (b) including that work in the database against which it checks other student-submitted work.

Students with Disabilities

- Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early as possible in the semester. DSP is located in STU 301 and is open 8:30 a.m.-5: 00 p.m., Monday through Friday. The telephone number for DSP is: 213-740-0776.

Students with learning disabilities or other special needs should contact me at the beginning of the term to discuss any accommodations that may be necessary.

Posting of Course Information

- I will use the USC Blackboard instructional intranet system for course communications including grades for course components, case discussion questions, overhead slides, and other relevant communication. You can access Blackboard either by going to <http://totale.usc.edu/webapps/portal/frameset.jsp> or by going through the “My Marshall” portal <http://mymarshall.usc.edu>. You will need your UNIX password for either site. After entering Blackboard, please double-check that your e-mail address is set to the one you wish to receive your class information through.

Visitors

- I have invited several guests to join us for different sessions to help us better understand the key issues covered in the cases. We may have to reschedule some sessions in order to accommodate their schedules.
- Several of you are welcome to join us at the dinner I will host for each guest at the University Center from 5-6pm. I will post a sign-up sheet within the USC Blackboard for you to sign-up beforehand.

#	Date	Session Topic and Assignments
1	8/29	Introduction/Formulating Technology Strategy Reading (skim before class – read more carefully later): <ul style="list-style-type: none"> • Note on Frameworks (read more carefully later as it becomes very important as the course develops) • (Readings) How strategists really think: Tapping the power of analogy *Case: <ul style="list-style-type: none"> • <i>Polaroid Corporation: Digital Imaging Technology in 1997</i> Note: Pick 3 group WAC's and 2 different individual cases for discussion leadership.
Module I: Creating Value		
2	9/5	Alliances for Process Technology Readings: <ul style="list-style-type: none"> • (Book, Ch 35) Involving Suppliers in New Product Development Case: <ul style="list-style-type: none"> • <i>Sharp-Xerox Strategic Alliance in Personal Copiers</i> <i>Guest: TBA</i> Note: Last day to determine if you are taking the exam or the project option. If choosing the project option, please confirm your topic by this session.
3	9/12	Core Technological Competencies and Rigidities Readings: <ul style="list-style-type: none"> • (Book, Ch. 5) Gunfire at Sea: A Case Study of Innovation • (Book Ch 21) Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development. Case: <ul style="list-style-type: none"> • <i>Chaparral Steel: Rapid Product and Process Development</i>
4	9/19	Entrant strategy during periods of technological change <ul style="list-style-type: none"> • Reading: (Readings) Disruptive Technologies: Catching the Wave Case: <ul style="list-style-type: none"> • <i>Making SMaL Big: SMaL Camera Technologies</i>

5	9/26	Losing Core Technological Competencies Reading: <ul style="list-style-type: none"> • (Book, Ch 28) Organizational Knowledge Case: <ul style="list-style-type: none"> • <i>Corning, Inc.: Rapid Product and Process Development</i>
6	10/3	Incumbent strategy during periods of technological change <ul style="list-style-type: none"> • Reading: (Book, Ch 20) The Ambidextrous Organization: Managing Evolutionary and Revolutionary Change Cases: <ul style="list-style-type: none"> • <i>Teradyne: Corporate Management of Disruptive Change</i> • <i>Teradyne: the Aurora Project</i> <p><i>Guest: TBA</i></p> <p>Note: Last day to select grading option</p>
7	10/10	Linking Strategy and Innovation Reading: <ul style="list-style-type: none"> • (Book, Ch. 2) Capabilities, Cognition, and Inertia: Evidence from Digital Imaging • Creating Project Plans to Focus Product Development Case: <ul style="list-style-type: none"> • <i>Linking Strategy and Innovation: Materials Technology Corporation</i>
8	10/17	Mid-Term Exam
Module II: Capturing Value		
9	10/24	Protecting Intellectual Property-1 Case: <ul style="list-style-type: none"> • <i>Rambus, Inc., 2005</i>
10	10/31	Protecting Intellectual Property-2 Case: <ul style="list-style-type: none"> • QUALCOM
11	11/7	Developing Technological Competencies in Scale and Scope Reading: <ul style="list-style-type: none"> • (Book, Ch. 29) Organizing and Leading “Heavyweight” Development Teams. Case: <i>New Product Development at Canon</i>

12	11/14	The Legal Context of Technology Strategy Reading: <ul style="list-style-type: none"> • (Readings) Intellectual Property and Strategy Case: <i>The Patent License Exchange</i>
13	11/21	Capturing Value through Design Case: BMW A.G.: The Digital Car Project Field trip to BMW Designworks (TBA)
Module III: Delivering Value		
14	11/28	Technology Strategy – Synoptic Diversification Reading: <ul style="list-style-type: none"> • (Readings) Spinning Out a Star Case: <i>The Rise and Fall of Iridium</i>
15	12/5	Technology Strategy – Incremental Diversification Reading: <ul style="list-style-type: none"> • (Readings) Sequential Testing in Product Development Case: <ul style="list-style-type: none"> • <i>Space Data Corporation</i>
16	12/12	FINAL EXAM 7-9PM

*Not available for WAC

Appendix A: Participation Behaviors and Associated Scores

Excellent performance range: 100 to 90

- initiates information relative to topics discussed
- accurately exhibits knowledge of assignment content
- demonstrates excellent listening by remaining on "same page" as rest of class as demonstrated by comments
- brings up questions that need to be further explored
- clarifies points that others may not understand
- draws upon practical experience or personal opinion
- offers relevant/succinct input to class
- actively participates in simulations and classroom exercises
- demonstrates ability to apply, analyze, evaluate, and synthesize course material
- demonstrates willingness to take risk in attempting to answer unpopular questions

Good performance range: 85 to 89

- regularly participates in discussions
- shares relevant information
- gives feedback to classroom group discussions
- consistently demonstrates knowledge of reading assignments
- demonstrates ability to analyze/apply course material
- demonstrates willingness to attempt to answer questions

Fair/average performance range: 80-84

- participates in group discussion when solicited
- demonstrates knowledge of course material
- offers clear, concise, "good" information relative to class assignments
- offers input, but tends to reiterate the intuitive
- attends class regularly

Poor performance range: 75-79

- occasional input, often irrelevant, unrelated to topic
- reluctant to share info
- not following flow of ideas
- personal application only
- drains energy from class goals

Unacceptable performance range: <74

- fails to participate even when specifically asked
- gives no input
- does not demonstrate knowledge of readings
- shows up to class; does nothing
- group distraction
- irrelevant discussion
- not sticking to topic
- Behaves toward others in disruptive fashion, for example, sarcastic comments aimed at others

Appendix B: Engagement Contract & Client Evaluation

“As <job title> of <client organization>, I agree to support the USC MBA consulting team in analyzing our strategy and organization. I understand that this will require our organization to provide the team with the relevant information. It will also require some time for interviews with myself and a few other members of our organization. At the end of the engagement, sometime before April 30, 2004 the consulting team will report their conclusions to others and me in the organization. This report will take the form of a 35-40 minute oral presentation and the accompanying documentation. There should be a following discussion by my team and I in reaction to the report. The consulting team will videotape this presentation to me and my team, and the ensuing discussion, and USC MBA faculty will review the tape as part of the evaluation of the team’s performance. The videotape and written material will not circulate beyond the consulting team and the faculty responsible for evaluating the team without my express prior approval. At the conclusion of the project, I will respond to a brief questionnaire from the faculty on the team’s performance.”

Signature**Title****Telephone****E-mail**

EVALUATION FORM

TO: senior client executive

FROM: Prof. Phil More

The USC MBA faculty thanks you for allowing our students to study your organization. We appreciate the time and effort this has taken on your part. These consulting projects have proven to be an immensely valuable component of our MBA program, so we are very grateful for your help. In return, we hope this project has provided you with some useful ideas.

In order to assess better the team's performance in this project, it would be very helpful if you could take a few minutes to jot down your evaluation under the following headings:

- professionalism in interacting with you and other members of your organization
- quality of the team's assessment of your current situation and issues
- quality of the team's recommendations concerning strategy
- quality of the team's recommendations concerning implementation

Please fax this sheet to my office (213-740-3582) by April 30, 2004. On behalf of USC, allow me to thank you once again,

Sincerely,

Prof. Philip H.B. More

PEER EVALUATION

As part of your WAC'S and (if applicable) your project report, I would like each of you to evaluate the contribution made by each of your team members. Allocate 100 points across all the members of your team apart from yourself, so as to reflect your assessment of their individual contributions to the team effort. I will treat your assessments as confidential.

Your name: _____

Team-member name:	contribution:
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____

Total:	100
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