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

MOR561
Strategies in High Technology Businesses
Fall, 2010

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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 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 - 8: 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 begin with the Chaparral Steel case to explore sustained technological leadership in mini-mill steel production through internal resources and dynamic capabilities in technology. We then turn to a series of two cases that deal with developing dynamic capabilities through closed (Sharp-Xerox) and open (InnoCentive) alliances for technological leadership. Following the two case series on alliances, we turn to crating value through disruptive technology. The Teradyne case presents us with an interesting situation of

how some executives are able to ride the wave of change in technology in changing the basis of competition. The SMaL Camera case takes this approach a step further by examining the choices available to a small firm after creating a disruptive technology and now faces the response by more established competitors.

Week 7

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 - 11: 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. The first case in this series deals with linking firm strategy with technological development in a start-up where the issues are keeping the doors open vs. developing future technological platforms. In the situation Materials Technology Faces, they have captured some initial value from their breakthrough technology but are now faced with how to maintain and grow that value when faced with competing needs. Next, we examine two cases that deal with alternative means for retaining their intellectual property in semiconductors with the Rambus and QualComm cases. Next we turn to the case of Canon and how they capture value through internal product development practices and competitive dynamics. and compare that with retaining intellectual property in wireless. Following the session on erecting legal barriers to imitation we turn to non-legal barriers such as how some firms create barriers through both economies of scale and scope (Canon case).

Weeks 12 – 14: Module III – Delivering Value

In this module we focus on delivering value through product design and internal diversification. The first two cases, BMW and IDEO investigate alternative product design approaches that exemplify "design thinking". We are working to provide a field trip to BMW Designworks USA in Newbury Park for you to see how BMW does this and have invited a guest speaker from IDEO to visit and discuss their approach to design thinking and product development. In the final two cases, Iridium and Space Data we examine two alternative approaches for diversification in order to deliver customer value.

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 during the first session, you will be asked to form yourselves into one of 12 groups of from 4-5 people (max) and to then randomly draw a number that corresponds to specific case preparation responsibilities. These responsibilities include three written analyses and two leadership of the discussion for five different cases. See below for further details.

Discussion Leadership

Discussion leadership means that the members of your group should be prepared to take on leadership responsibilities during the case discussion by carefully comparing the presenting team's approaches to the case analysis and identify any differences between them and your own group's analysis. Further, your group should be prepared to help integrate the underlying

concepts that emerge from the discussion with the concepts previously discussed so that the class as a whole is able to any new information into their evolving framework.

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. 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 Monday, 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., Monday, November 30th. 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. 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.

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). The exam will be available on Blackboard and the file will be set to open at the specified date and time in the syllabus. 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.

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

Course administration

Office Hours

I will be available before class from about 6:00 – 6:15 p.m. in the food court of Popovich Hall. My regular office hours are Mondays and Wednesdays 1:00-2:00 p.m. in my office and by appointment. 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." (<u>Faculty Handbook</u>, 1994: 20)

Academic dishonesty includes: (<u>Faculty Handbook</u>, 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.

<u>Students with Disabilities</u>

- 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.

<u>Posting of Course Information</u>

- 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.

<u>Visitors</u>

- 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 5-6 p.m. I will post a sign-up sheet within the USC Blackboard for you to sign-up beforehand.

#	Date	Session Topic and Assignments
1	9/1	**Introduction/Formulating Technology Strategy** Reading (skim before class – read more carefully later): • 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: • *Polaroid Corporation: Digital Imaging Technology in 1997* Note: Pick 3 group WAC's and 2 different individual cases for discussion leadership.
		Module I: Creating Value
2	9/8	**Core Technological Competencies and Rigidities** Readings: • (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: ***Chaparral Steel: Rapid Product and Process Development***
3	9/15	**Collaboration Alternatives: Closed Alliances** Readings: • (Book, Ch 35) Involving Suppliers in New Product Development Case: • *Sharp-Xerox Strategic Alliance in Personal Copiers* *Guest: Dr. Robert Goren, not yet confirmed* • 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.

4	9/22	**Collaboration Alternatives: Open Alliances** Reading • Which Kind of Collaboration is Right for You? Case • InnoCentive
5	9/29	**Incumbent strategy during periods of technological change** • Reading: (Book, Ch 20) The Ambidextrous Organization: Managing Evolutionary and Revolutionary Change Cases: • *Teradyne: Corporate Management of Disruptive Change* • *Teradyne: the Aurora Project* **Note: Last day to select grading option**
6	10/6	**Entrant strategy during periods of technological change** • Reading: (Readings) Disruptive Technologies: Catching the Wave Case: • *Making SMal Big: SMaL Camera Technologies*
7	10/13	***Mid-Term Exam***
8	10/20	**Linking Strategy and Innovation** Reading: • (Book, Ch. 2) Capabilities, Cognition, and Inertia: Evidence from Digital Imaging • Creating Project Plans to Focus Product Development Case: • *Linking Strategy and Innovation: Materials Technology Corporation*
		Module II: Capturing Value
9	10/27	**Capturing Value Through Protecting Intellectual Property-I** • (Reading) Strategic Management of Intellectual Property • Case: • *Rambus, Inc., 2005*
10	11/3	**Capturing Value Through Protecting Intellectual Property – II** Case: • *Qualcomm 2004*

11	11/10	**Developing Technological Competencies in Scale and Scope** Reading: • (Book, Ch. 29) Organizing and Leading "Heavyweight" Development Teams. Case: • *New Product Development at Canon*
		Module III: Delivering Value
12	11/17	**Delivering Value through Design I** *Case: BMW A.G.: The Digital Car Project* **Field trip to BMW DesignworksUSA**
13	11/24	**Delivering Value through Design II** Reading: • (Readings) Design Thinking Case: • *IDEO Product Development* *Guest: TBA*
14	12/1	**Technology Strategy – Synoptic & Incremental Diversification** Reading: • (Readings) Spinning Out a Star Cases: • *The Rise and Fall of Iridium* • *Space Data Corporation*
15	12/8	**FINAL EXAM (Please verify this date and time with the Final Exam Schedule in the Schedule of Classes)** 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

WAC & Discussion Group Assignments

Group	Chaparral	SharpXerox	InnoCentive	Teradyne	SMaL	MTC	Rambus	Qualcomm	Canon	IDEO	Iridium	SpaceData	Count
1	WAC		DISC		WAC		DISC		WAC				5
2		WAC		DISC		WAC				WAC		DISC	5
3	DISC		WAC				WAC		DISC		WAC		5
4				WAC			DISC	WAC		DISC		WAC	5
5	WAC	DISC			WAC				WAC		DISC		5
6		WAC	DISC			WAC		DISC		WAC			5
7	DISC		WAC		DISC		WAC				WAC		5
8				WAC		DISC		WAC		DISC		WAC	5
9	WAC	DISC			WAC				WAC			DISC	5
10		WAC		DISC		WAC		DISC			WAC		5
11			WAC		DISC		WAC		DISC		WAC		5
12				WAC		DISC		WAC		DISC		WAC	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	

WAC = WRITTEN ANALYSIS OF CASES

DISC = DISCUSSANT LEADERSHIP