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

MOR561
Strategies in High Technology Businesses
Fall, 2012

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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 and Formulation of Technology Strategy

We survey the overall course framework and requirements with special attention to technological evolution and its implications for strategy in high tech firms. In addition, we'll spend some time discussing the concept of developing a personal framework from the course materials which is a key part of your learning in this course.

Finally, we'll discuss Formulating Technology Strategy with the example 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.

Module I: Creating Value (Wks. 2-3)

We begin this module with how value is created through alliances in the Sharp-Xerox case and through design with the IDEO case. The Sharp-Xerox case is a challenging one and was written especially for this course to illustrate how alliances work in practice between two technology firms trying to prosper in a global industry dominated by vertically integrated competitors. In the second case, we deal with the challenge of creating value through design thinking and

ideation. We hope to have a representative from the worldwide leader in industrial design consulting (IDEO) with us to discuss their process for creating value of design thinking and ideation.

Module II: Capturing Value (Wks. 4-8)

This module deals with capturing value once created. First, we turn to the situation at DuPont once it created the wonder product of Kevlar and how they eventually captured value despite some common financial barriers to successful innovations. Next we turn to a discussion of Canon and consideration of how firms capture value through erecting barriers through economies of scale and scope. Then we examine alternative means of capturing value from intellectual property in semiconductors with the Rambus case and in wireless phones with the QUALCOMM case. Finally, we end this module with two cases that deal with platform industries which are increasingly common in a variety of situations and deal with situations of winter take all dynamics and the case of Adobe and then envelopment with the case of Google.

Module III – Delivering Value (Wks. 9-15)

In the final module we turn to delivering value. In the first case, we examine how BMW delivers value by integrating the principles of design thinking (from our 3rd session) with manufacturing. I am working on providing a field trip to for you out to BMW DesignworksUSA in Newbury Park so you can see how BMW does this. Next we raise issues associated with modularization and commoditization in the case of Quanta Computer where we examine the competition from the perspectives of several players in the PC industry. Then, we turn to the case of Hospital Equipment Corp. to consideration how firms struggle to deliver value due to common organizational innovation barriers. Then we examine how firms deliver value despite rising innovation costs following an industry shakeout with the case of IBM in radical collaboration in microelectronics. Next we discuss how SMaL Camera, a new industry entrant with a potentially disruptive technology, can deliver value after an initially successful product that places them in the cross-hairs of their much larger incumbents. We end the course with the case of Teradyne, a firm that tries to deal with some of the issues raised by the Polaroid case in our opening discussion.

Course Requirements

Materials

The course packet (Reader) contains the cases and some of the supplementary readings. Other supplementary readings are available through the Crocker Library using links provided in Blackboard (Bb). 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 packet 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. Individual Term project   60%

Retention of Graded Work: Final exams and all other graded work which affected the course grade will be retained for one year after the end of the course *if* the graded work has not been returned to you (i.e., if I returned a graded paper to you, it is your responsibility to file it, not mine).

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 <u>three</u> 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. <u>the day before</u> 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).

An individually prepared term project makes up the remaining 60% of your grade.

Individual Term Project

This is an individual paper relating an aspect of the course applied to a practical managerial problem in which you demonstrate your ability to use the framework you've developed. You can undertake one of two types of projects. One is a field project, essentially a consulting assignment that applies the framework 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 or currently); 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 DVD of your presentation to the client, and ask them to fax their evaluation of your performance NLT 7:00 p.m. Wednesday, December 7th.

Here are some examples of suitable projects:

- A small defense contractor has developed a stealth technology that they would like to find a commercial application for such as legally avoiding police radar by making a vehicle invisible. They have hired a consulting firm but would like a student to also analyze the potential applicability of their technology to this new market. This represents a potential related diversification but the firm does not currently have any commercial expertise and there are already established competitors as well as legal issues to consider in choosing whether and how to enter this potential market.

- A global consumer products firm currently uses a mix of cross-functional virtual and f2f teams to develop strategic options for top management to choose between for dealing

with unpredictable opportunities and threats. However, the virtual teams are consistently unable to develop solution options that are as novel as the f2f teams. How can senior management improve the performance of their virtual teams in situations where an f2f team is not feasible (e.g., global operations).

Alternatively, you may develop a case and analysis using library sources and or field interviews. Such a case could 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 both a description of the decision problem as well as 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.

Here are some examples of topics for this alternative:

- If past experience is any guide, there are many firms who did well with their founder at the helm but who then stumbled after that individual left the company (e.g., Xerox, Polaroid, Disney, IBM, and GE). Apple is currently at such a potential cross-roads yet its stock price continues to grow. How is Apple similar/different from the past examples and what accounts for their increased stock appreciation despite the health problems of Steve Jobs? What conclusions do you draw from your analysis and why (e.g., Apple will fall like the others or continue to succeed because)?

- There are many recent examples of the effects of disruption in the press (e.g., Block Buster, Borders). There are also a number of potential disruptions that have not yet played out (e.g., tablets, cloud computing). Picking one of these (or another) industry where potential disruption is underway, what similarities and differences are there between the actions of the current competitors (e.g., firms doing the disrupting and those being disrupted) actions from those who we have studied and are currently in the press.

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 7:00 p.m. Wednesday, December 7th. Late submissions will be marked down one letter grade.

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 4:00-5:00 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." (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.

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

In the Session Outline below (Bb) refers to links posted in Blackboard, (Book) refers to the assigned text book, and (Reader) refers to the cases and article readings available for purchase in the University Bookstore.

#	Date	Session Topic and Assignments
1	8/29	**Introduction - Formulating Technology Strategy** Reading (skim before class – read more carefully later): • (Bb) Note on Frameworks (read more carefully later as it becomes very important as the course develops) • (Bb) How strategists really think: Tapping the power of analogy • (Book, pp. 59-69) Gunfire at Sea: A Case Study of Innovation • (Bb) Why hard-nosed executives should care about management theory *Case: • *(Reader) 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	9/5	**Creating Value Through Collaboration** Readings: • (Book: pp. 506-522) Involving Suppliers in New Product Development Case: • *(Bb) Sharp-Xerox Strategic Alliance in Personal Copiers*
3	9/12	**Creating Value through Design** Reading: • (Reader) Design Thinking *Case: • *(Reader) IDEO Product Development* ***Guest: Jonah Houston, Senior Project Leader IDEO, Palo Alto (Confirmed)***
		Module II: Capturing Value

4	9/19	**Capturing Value Through Disruption** Reading • (Bb) Innovation Killers • (Reader) Discovery-Driven Planning Case: • *(Reader) DuPont Kevlar*
5	9/26	**Capturing Value Through Scale and Scope** Reading: • (Bb) The Knowledge Creating Company Case: • *(Reader) New Product Development at Canon*
6	10/3	**Capturing Value by Protecting Intellectual Property** Reading: • (Bb) Strategic Management of Intellectual Property Cases: • *(Reader) Rambus, Inc., 2005* • *(Reader) Qualcomm 2004*
7	10/10	**Capturing Value Through Winner Take All Strategies in Platform Industries** Reading: • (Bb) MIT Executive Summary • (Bb) PMN Winner Take All Dynamic Slides Case: • *(Reader) Adobe*
8	10/17	**Capturing Value Through Envelopment Strategies in Platform Industries** Reading: • (Bb) PMN Envelopment Slides Case: • *(Reader) Google*
		Module III: Delivering Value

9	10/24	**Delivering Value through Integrating Design & Manufacturing** Reading: • (Bb) Materials posted *Case • *(Reader) BMW A.G.: The Digital Car Project (A)* **Field trip to BMW DesignworksUSA (confirmed)**
10	10/31	**Delivering Value through Modularity and Commoditization** Reading • (Book, pp. 151-160) Managing in an Age of Modularity • (Reader) How GE is Disrupting Itself Cases: • *(Reader) Quanta Computer*
11	11/7	**Delivering Value Through Organizations** Reading • (Book, pp. 292-306) Core capabilities and rigidities • (Book, pp. 419-431) Organizing and Leading Heavyweight Development Teams Case • *(Reader) Hospital Equipment Corp.*
12	11/14	**Delivering Value Through Collaborative Innovation** Reading • (Bb) Innovation and Shakeouts • (Bb) Future of Integrated Electronics Case: • *(Reader) Radical Collaboration in Microelectronics*
13	11/21	**THANKSGIVING HOLIDAY**
14	11/28	**Delivering Value as a New Entrant** Reading: • (Bb) Disruptive Technologies: Catching the Wave Case: • *(Reader) Making SMal Big: SMaL Camera Technologies*

15	12/5	**Delivering Value as an Incumbent** Reading: • (Book, pp. 276-291) The Ambidextrous Organization: Managing Evolutionary and Revolutionary Change Supplemental Reading: • (Bb) Smith Corona Cases: • *(Reader) Teradyne: Corporate Management of Disruptive Change* • *(Reader) Teradyne: the Aurora Project*
16	12/12	**FINAL PAPER DUE**

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 me 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 me 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	Shp/Xer	DuPont	Canon	Ram/QUAL	Adobe	Google	BMW	Quanta	Hospital	Radical	SMaL	Teradyne	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