ETM 559/659
Global Technology Management
Fall 2009
Prof. Paul R. Newman Ph.D.

Contact information:
Prof. P. R. Newman
Telephone: 503-351-0939
e-mail: prnewman1@comcast.net
Class Website: bb.pdx.edu
Mailing Address: P.O. Box 25815, Portland, OR 97298
Office Hours: After class or by arrangement.

Course Overview & Learning Objectives:

COURSE DESCRIPTION
ETM 559/659 GLOBAL TECHNOLOGY MANAGEMENT is a four-credit (40-hour), graduate-level course structured around 11 lectures, historical case studies, and a student project. The course is aimed at managing the development of technology-driven products and services in a global setting. Today’s high-speed worldwide businesses must operate in extended environments in terms of both product development and market places. This course will focus on tools and techniques of accessing technology and operating product development teams that are frequently co-located in extended locations, often in other countries halfway around the world. This can result in issues arising from cultural, language, time zone, and financial and legal restrictions in different nations. Marketing and sales channels that are successful here in the US, often completely miss the mark when pursued without modification abroad. To address this, the class will focus on topics related to selling and distributing products and services in foreign markets. In keeping with the diverse backgrounds of our typical students, discussions and examples will frequently touch on specific technology industry related situations of students’ native countries.

Course activities include selected readings from “Managing Global Innovation” by Boutellier, Gassmann, and von Zedtwitz supplemented by case-study monographs. There is also a team participation project designed to take the participant not only through theoretical discussions of technology management, but to give a feel for the real world of global management. The course is designed to emphasize managing the development of technology-based products and services for the global market.

COURSE OBJECTIVES --
After completing the readings, lectures and assignments the student will be able to:

- Understand the historical evolution of Global R&D
- Explore internal and external cultural characteristics that affect international teams
- Follow the importance of the both the formal and informal communication networks and understand their importance to innovation
- Be familiar with “virtual teams” and some of the tools that can be used to maximize their effectiveness
- Understand the concepts of continual reinvention and patching to take maximum advantage of market opportunities.
- Comprehend the various forms of non-local R&D sites and the corporate R&D philosophy behind them
REQUIRED TEXTBOOK –

The text *Managing Global Innovation* may be purchased through the PSU Bookstore, or through Amazon.com at [http://www.amazon.com](http://www.amazon.com)

REQUIRED READINGS –


The Harvard Case study may be purchased on-line for approximately $3.99 at: [http://cb.hbsp.harvard.edu/cb/access/4422305](http://cb.hbsp.harvard.edu/cb/access/4422305)

Optional Supplemental Readings –


ASSIGNMENTS --

Submissions --

Your completed assignments are due at the beginning of each classroom session. Specific submission instructions will be included in all assignment instructions.

Late Policy --

You are expected to turn in assignments on time. If you think you will be unable to complete an assignment on time, please email the professor in advance. Otherwise you will receive a grade of “0” for that assignment.

Plagiarism --

You should note that using information without attributing it to its source constitutes plagiarism. In this course, you will do research and use a variety of media to complete assignments. If material is quoted directly from any source, the source must be cited in your deliverable. (Check with the professor if you are unsure of the citation formatting or placement.) The source of non-quoted information or statistics used in support of any point must also be cited, including information from websites and other online sources. Any submission that is not properly documented will receive a grade of “0.”

A strongly suggested reading and one you might want to download for reference is: [http://writingcenter.pdx.edu/resources/guide/step09.php](http://writingcenter.pdx.edu/resources/guide/step09.php) Make sure you click on “view all of the resources for this section.”
Preparation --
You will be expected to prepare for class by reading the assigned materials and completing project and group work as assigned. Although you are expected to be familiar with all the concepts and terminology introduced in the readings, you will not be required to memorize detailed information. You must be able to intelligently discuss the patterns, concepts, strategies, etc. described in each chapter of the text. You must also be familiar with the case studies throughout the book, as well as the 12 historical case studies. Finally you are expected to listen to the lectures each week, understand the concepts that are presented and contribute to the class discussion. Material presented during the lecture parallels the text and the historical studies, but frequently contains additional material not covered in these sources.

Written Assignments --
There are weekly reading assignments from both the text and selected case studies. The written assignment is to be turned in by the next session.

Exams --
There will be no exams in this course.

EVALUATION –
The course evaluation will be determined as follows –

50% Individual Written Assignments
10% Individual Class Participation
40% Student Team Projects

This course is not about number of pages, hours in class, or number of e-mails. It is about ideas, concepts, and communication; the grade will reflect your ability to understand ideas and communicate them to the rest of the class and to the professor.

Course Schedule:
Class will be held from 5:30 pm to 9:10 pm on Thurs. in room 389 of Neuberger Hall on the PSU Main Campus. Please check the ETM website for any last minute changes.

ABOUT THE PROFESSOR –
PAUL R. NEWMAN, Ph.D., Professor, Dept of Management in Science & Technology

Dr. Newman has over 22 years of senior management experience in high-technology companies such as Rockwell International Corporation, JBL Professional and Electro Scientific Industries. His technical background in solid-state physics has enabled him to make a number of significant technical contributions to these companies as evidenced by his 43 technical publications and his 4 US patents. Over the years, his technical career evolved into one of positions of increasing management responsibility, strategic planning, and finally responsibility at the executive level. At Rockwell, Dr. Newman was promoted from Member of the Technical Staff to Group Manager, to Principal Scientist where he functioned as an internal consultant connecting the resources of the Corporate R&D Lab to the needs of the Operating Divisions. At JBL Professional, Dr. Newman was Vice President of R&D, and was responsible for launching over 30 new products, reducing product development cycle time and improving overall product quality. He was the Director of Applied Technology for Electro Scientific Industries; a position that gave him responsibility for planning both long and short term strategic R&D for the company. Currently Dr. Newman is President of Cooper Mountain Research, Inc., an independent consulting firm focused on the strategic management of science and technology. Dr. Newman obtained his BS degree in physics from Antioch College, his Doctorate from Michigan State University, and did Post Doctoral work at the University of Pennsylvania’s Laboratory for the Research on the Structure of Matter.
## Class Outlines and List of Assignments

### Unit 1 – Thursday, October 1 – Setting the Stage – The origins of Global Innovation

**Learning Objectives:**

After completing this unit, you will be able to:

- Be familiar with the parameters and metrics of global R&D
- Understand which countries are finding sources for technology development offshore
- Follow the concept of “dominant design” and how it is a competitive advantage globally
- Understand technology evolution and “fusions”

**Assignments to be completed & turned in by Thursday 10/01/2009:**

**Assigned Reading:**

1. *Managing Global Innovation*: Preface, Chapter I.1, Challenges of Organizing International R&D

**Answer the Following questions based on the reading assignments:**

1. The textbook makes the comment that the “Global R&D & innovation is mostly a matter of multinational companies.” Explain why this is so, and that a single nation company is less likely to fund foreign R&D? (20 pts)

2. Compare & contrast how much in total is spent on R&D by each of the following countries: US, Japan, & Korea, as well as what fraction is spent inside their own nation. Speculate on why this is so, and does this approach appear to be working? (10 pts)

3. Explain, in your own words, (don’t simply copy without explaining!!) the concept of “dominant design”, how it emerges, and what its characteristics are. What metrics could be used to measure if a one-product design is becoming dominant? (20 pts)

4. What is the concept of “technology fusion?” Explain and give an example of how one country can be the dominant innovator of one or more of the merging technologies, but still be the loser in the market when the technologies merge. (20 pts)

5. On P365, the textbook lists 4 “most important drivers for globalization.” Did they leave anything out especially as it pertains to technology and technology related markets? What and why? (20 pts)

6. Consider the international project “XTRAS”. What was it? Explain which of the 4 investment categories this project fell into and why. What were the challenges, how did Xerox respond, and what were the lessons learned? (10 pts)

**Invited Speaker:** Mr. Don Titterington, VP Ink and Printer Technology Development, Xerox, Wilsonville, OR
**Unit 2 – Thursday, October 8 Globalized Innovation—Far and Wide**

### Learning Objectives:
After completing this unit, you will be able to:

- Understand the historical trends for international globalization of R&D
- Observe peculiarities and exceptions and understand the cultural differences for R&D practices
- Understand the concept of
  - Request R&D projects
  - Proposal R&D projects
- Comprehend the difficulties in solving R&D deficiencies through mergers and acquisitions
- Know the reasons why and when you might want to outsource R&D and also when you might not.

### Team Assignment

1. Organize a team meeting to elect your “Product Development Team” officers. You will need a CEO, a CFO, VP of Eng. and a VP of R&D.

2. Consider that you are a new product development team inside an existing large corporation that is based here in the US. Your team has been given the task of developing a new product using leading edge technology. For a number of reasons (covered in Unit 2 above) your company has decided to develop the product using a globally extended network of development teams. Your task is to come up with a development plan that will utilize teams in the US, China, and one of the native countries of your teammates. The product must be designed for the US market and one of the countries you are developing it in.

3. Your team must carry out research to identify REAL organizations in the target countries that can be part of the team to accomplish:
   - a. The R&D
   - b. The engineering design and validation
   - c. The manufacturing/production

Your research may involve any and all media, friends, networks, phone calls, Internet, e-mails etc, in any language... but the results must all be presented in English.

4. The deliverables will be a 45 minute PowerPoint “Project Proposal” to your boss, and a written summary including a “Gantt Chart” of critical milestones. **Due Week 9!!**

5. You may choose your team’s product development approach from the following technologies (More than 1 team can choose a given technology):
   - a. Augmented Reality
   - b. Quantum dots-based solar cells
   - c. Light focusing “optical antennas”
   - d. Low voltage “wireless power”
   - e. OLED’s (Organic Light Emitting Diodes) and “Flexible” light panels

### Assignments to be completed by Thursday, 10/8/2009

**Assigned Reading:**

1. **Managing Global Innovation:** Chapter I.2, Extent of R&D Internationalization
2. **Example of an International Project: Renderware—A Joint Project Across the Pacific,** Managing Global Innovation, P390

**Answer the Following questions based on the reading assignments:**

1. Consider the data on P42-43 of *Managing Global* on R&D expenditures. (Look also at the updated version in the 2008 Global R&D Report) When considered as individual countries, the US is clearly among the leaders in terms of total R&D expenditures, and R&D as a % of world R&D expenditures. However, when you consider R&D expenditure as a % of GDP, Japan is significantly above the US, but lower in terms of the % of the world expenditure. Comment on this as to what the reason could be. Doesn’t this behavior seem to be the opposite of the rest of the world? Why? (20 pts)

2. Observe the two graphs in Fig I.2.3 on P46 of the text. State in your own words what the two plots show in terms of world trends for firms around the world in terms of how they are accomplishing their R&D. Pay particular attention to a) funding amounts and b) where that funding is going. Again note that the Japanese seem to be not following the general trend. (10 pts)

3. The authors state that in terms of attempting to accomplish R&D through a merger or acquisition of another company, “the acquirer faces the challenge of rearranging the R&D activities of both firms in order to ensure some form of synergy exploitation.” (P.47) Explain in your own words a) why this is so important, b) why it is often difficult... sometimes impossible leading to eventual disaster and c) why if it is pushed too hard, this type of management strategy can often lose the very advantage you sought through the acquisition in the first place. (20 pts)

4. Next, regard the R&D Outsourcing Becomes... article. What are the top 2 reasons for outsourcing (although not necessarily offshore!) R&D. Do you agree? Explain in your own words why or why not. Do the same for why you might not want to outsource. (20 pts)

5. In the Renderware case study, the authors make the observation “Thus even in the R&D Centers it was important to have employees who know how to exploit the R&D results.” Explain in your own words what is meant by this statement and why it is so important in terms of maximizing the overall performance of the company. (20 pts)

6. In Renderware, the authors refer to proposal-based and request-based R&D. What are these? (10 pts)
### Learning Objectives:

After completing this unit, you will be able to:

- Understand strategies for performing innovation locally and globally
- Consider how global resources may both contribute to and deteriorate internal competences
- Gain some insight into the emerging technology realm in China

### Team Exercise:

1. **With your team, select one of the emerging technologies from the above list; research the subject to find potential applications (real products that will come to market within 5 years).**

2. **Having chosen an application, begin to form your product development plan. In particular, carry out an analysis of what specific skills and capabilities (competencies) the team must have in order to develop the product. These should include specific types of: R&D, market research, engineering, and production.**

3. **Choose a real American company to function as your “home base.” For this exercise, you will assume you are forming an international team, based in this US company, but with segments elsewhere. You should also choose your eventual global market strategy—where do you want to launch the product, and what are the subsequent markets?**

4. **One of the other teams you will be working with is in China. Pick the third team country from your knowledge about potential markets for your product, or from a country native to one of your teammates.**

### Assigned Reading to be completed before Thursday 10/15/2009

**Assigned Reading:**

1. **Managing Global Innovation:** Chapter I3: Foreign R&D in China
2. **IV.7 Huawei: Globalization Through Innovation,** Managing Global Innovation, P.507

### Answer the Following questions based on the reading assignments:

1. In the text, the authors state “…foreign R&D laboratories in China are not only important vehicles for local market development, but increasingly important sources of locally developed technology.” Explain what is meant by that, paying particular attention to the traditional thinking about foreign R&D “outposts” as market entry vehicles. (20 pts)

2. In **Globalization of R&D.**” the authors give 4 different strategies for foreign R&D in developing countries like China and India. Discuss each of these in your own words, explaining in more detail what each strategy really means. Which one(s) do you think are the major drivers in today’s environment? (20 pts)

3. Also in **Globalization of R&D..** the authors state: “The strategies of MNEs’ R&D activities in these developing countries (India & China) may represent a mixture of tactical short-term adaptation of operations and more strategic medium-term product development and long-term knowledge creation.” Explain what is meant by this, discussing your answer in terms of the technology innovation cycle (Emerging Technology (basic science), Innovation, and Commercialization). (10 pts)

4. Consider the statement in the conclusion of **Globalization of R&D”… the allocation of R&D activities of multinationals in China causes further concerns of “hollowing out” of the innovation capacity in the OECD countries and losses of core technology and skills.” Do you agree with this? Is it a real threat to national competitiveness? Explain why or why not. (20 pts)

5. From the text, how would you characterize the difficulties that you might face as a foreign manager (use your own country as a basis if you are not from the US) managing a Chinese R&D staff? How would you personally overcome them? (10 pts)

6. Read the Huawei case study. Note their “Three-High Policy” management style. Next read about the various places Huawei has established markets, and indicate what problems they would have in those countries (as well as the region of your native country if you are not from the US). Indicate what advice you would give to the Chinese management that is attempting to manage in your country. (20 pts)
### Learning Objectives:
After completing this unit, you will be able to:
- Understand what motivates companies to broaden their R&D activities
- Understand the differences between ethnocentric and geocentric forms of R&D
- See why the “national treasure” model is actually one that must evolve.

### Team Exercise:
1. Having selected your product, your foreign team country targets, begin doing research to identify **real** potential organizations that you can form a team with. These can be universities, government labs, private labs, suppliers of know technology or expertise. You may use any means at your disposal to identify and verify potential target organizations, but **you must validate that the target organization actually has the expertise that you are seeking.** You may use Internet research, library lookup, or conversations with classmates from the target countries, e-mail, or phone calls to do your research. You should note in particular that one of the challenges you face is that the language of the target country may not be one you or your teammates are conversant in. In that case, you will have to come up with the capabilities to do the research in that language.

### Assignment to be completed before Thursday 10/22/2009

#### Assigned Reading:
1. **Managing Global Innovation:** Chapter I.4, Internal Drivers, Chapter I.5, External Drivers

#### Answer the Following questions based on the reading assignments:

1. What part of their operations do most companies usually think of when they refer to “internationalization”? Why is this? What do you think the trend for current leading edge technology driven companies is? (20 pts)

2. In **Strategic Intent**, what mistakes did traditional strategists in companies like Xerox and Caterpillar make in responding to global competitors? Why were the Japanese so successful? (30 pts)

3. Looking in the text again, at the main drawbacks for “ethnocentric” centralized R&D, which one(s) do you think are becoming the most important today in terms of its effects on single country based corporations? Does this mean that no corporation that performs in-country R&D can ever succeed? Explain your answer. (20 pts)

4. Next, consider the “geocentric” model of international R&D. Explain why this solves some of the drawbacks of the previous model, and what the limitations of this geocentric approach are. Explain what a “technology park” is and give an example. (20 pts)

5. Consider a corporation that operates its R&D in the “national treasure” model. According to the text, what forces are operating that will eventually cause that model to change, and what are the resulting new forms? Do you agree with this assessment? (10 pts)
**Unit 5 — Thurs. October 29, 2009—Exploring the structure of Global Technology Development**

**Learning Objectives:**
After completing this unit, you will be able to:

- Become familiar with the ways that structure or corporate infrastructure configuration affects R&D
- See how structural forms must evolve as technology moves through the product development life cycle
- Understand how complex it is to implement the various forms of R&D structure in a matrix environment

**Team assignment:**
1. Begin the task of assembling your development proposal by outlining the specific tasks to be accomplished as part of the project. This will eventually be merged into a Gantt chart. If you are not familiar with Gantt charts, now would be a good time to do some background research.
2. Start assigning specific tasks to specific country teams. Make a risk analysis to try to identify potential barriers that will need to be addressed in order to be effective.
3. Make an initial estimate of a schedule of key events (milestones), who will accomplish them, and what manpower loading each task leading up to the milestone will need.

**Assignments to be completed before Thurs. 10/29/2009**

**Assigned Reading:**
2. Dupont: Gaining the Benefits of Global Networks—From the Science Base to the Marketplace, Managing Global Innovation: P293

**Answer the Following questions based on the reading assignments:**
1. Identify and explain in your own words, the 3 types of organizational structures (dimensions referred to by Hagstrom and Hedlund) that form the backbone for technology development. In your opinion, which one is often the most important to development teams: a)at the beginning of development b)during the engineering phase and c) post product launch (20 pts)
2. Who are the Schindler Group? Where are they located and what are their main products? Explain what issues may arise from the form of R&D governance they use. In particular you should address, loyalties, cultures, languages, and even performance reviews. (10 pts)
3. Define in your own words, the characteristic of technical informational called "sticky?" Are there metrics you can use to determine how sticky information is? (20 pts)
4. How does the stickiness of a particular technology determine whether the locus of development will be local or allows it to become a candidate for global development at multiple sites? (20)
5. Consider the organization of Dupont’s R&D and what decisions the management council had to make in order to get a new technology into the development pipeline. Which one(s) do you think are the most important and why particularly as it pertains to the global nature of their business? Next check your response against the articles conclusions on P.301. Do you agree? Why or why not? Does the "stickiness" (c.f. Que 4) pay a role here? (30 pts)

**Invited Speaker:** Our very own—Prof. Charles Weber who was a student of Prof Von Hippel’s at MIT.
### Learning Objectives:

After completing this unit, you will be able to:
- See how the flow of knowledge throughout the corporation is paramount to technology development success
- Learn about “virtual teams” and some of the tools that can be used to facilitate cooperative product development using extended teams.

### Team Assignments:

1. Continue your research on your international cooperative partners. Understand their particular situation.
   - a. Is your project likely to get their attention or is it too small?
   - b. Are their customers potentially some of your customers?
   - c. What are the Intellectual property laws in the relevant countries?
   - d. Are their regulations limiting export of information or technology?

### Assigned Reading:

1. **Managing Global Innovation**: Chapter I.7: Organizing Virtual R&D Teams

### Answer the Following questions based on the reading assignments:

1. **In managing Global...** the authors state: “A central dilemma in the organization of dispersed projects is project efficiency versus the effective use of specialized knowledge in dispersed knowledge centers.” Explain what this dilemma is, and what issues are causing this dilemma. (20 pts)
2. What are “virtual teams?” (See both the text and the Harvard Case study!!) (10 pts)
3. Explain in your own words the 4 determinants (P128.) for deciding which type of project team is best suited for a particular scenario. Which one or two seem to be the most important? (10 pts)
4. **In The Virtual Team...** explain the benefits of virtual teams to implementing new technology and developing new products. (20 pts)
5. Examine the tools that are suggested for facilitating virtual teams. Which ones have you used and which ones do you think are likely to be the most important? Explain your choices. (20 pts)
6. Why despite all the wonderful powerful interconnection technology that is available for communication with extended teams, is it best if possible to have a face-to-face kickoff meeting when the project starts? Why are occasional face-to-face meetings advised along the way? (20 pts)
Unit 7 – Thursday, November 12, 2009 The Market as a major Driver for R&D

Learning Objectives:
After completing this unit, you will be able to:
• Understand the difference between performing R&D according to technology push (the “way cool” approach) or according to market pull
• Be familiar with internal customer “stakeholders” and how their demands motivate R&D
• Learn about Siemens experiences in China

Assignments to be completed before Thursday 11/12/2009

Assigned Reading:
1. Managing Global Innovation: Chapter II.1: The Market as a Challenge for R&D
2. Siemens: Flying with the Dragon—Innovating in China, in Managing Global Innovation, P.695

Answer the Following questions based on the reading assignments:
1. Define the difference between “technology-push” R&D and “Market-Pull” R&D. (10 pts)
2. Consider a central corporate R&D Laboratory. Who are its customers? Who funds the R&D operations? Consider especially the 3 coordinates represented in Fig II.1.2 (Your professor worked at such an institution—The Rockwell International Science Center in Thousand Oaks, CA) (20 pts)
3. Discuss the motivation for laboratories doing basic research versus company development labs in quick paced commodities markets. What are the objectives and philosophies for each? (20 pts)
4. Consider The “Funnel” shown in Fig II.1.3. Explain why there is a missing step, another funnel if you will, ahead of this one. Consider the two main elements being fed into this funnel—where do they come from? (10 pts)
5. Why is taking market-orientation to the extreme as a driver dangerous? In other words, what may happen if you depend only on the customer to define the product requirements? (20 pts)
6. In Siemens—Flying with the… the authors state that recently the Chinese government has instituted a series of reforms with the intent to forge a direct link between R&D institutes and commercialization enterprises. Explain how in the China case, and in general, there is a danger in pushing this link too hard. (20 pts)

Team activities:
1. Put your presentation together and run through it with the team several times.
2. Everyone on the team must present at least one element of the presentation
3. Make sure you have a complete presentation covering all the relevant points so that your request for project funding will be accepted by your boss (me!).

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Learning Objectives:
After completing this unit, you will be able to:
• Be familiar with the process of presenting a winning project proposal to corporate senior management.

Team Project Presentations!!!
Each team will have up to 45 minutes to present their plan to developing their selected technology into a product using globally diverse teams. The team must assume that it is part of an existing US technology Company and is making a presentation to obtain funding and permission to launch a new development project from the company management. The presentations will be scored as follows:

1. Description of the product as an application of the chosen product including relevant technical issues and challenges to be solved by the teams prior to manufacturing launch (30 pts)

2. Identification of specific real organizations in the target countries along with their capabilities and reason for being on the team (20 pts)

3. Issues and Challenges associated with carrying out development activities such as IP, export limitations, cultural differences, and legal restrictions, along with how the team will overcome them. (30 pts)

4. A detailed activities schedule in terms of a Gantt chart showing key milestones and indicating the relevant team at each activity

5. A budget to match to the schedule. (10 pts)

6. An indication of the specific methods of communication to be used between the teams at each point. Pay particular attention to extended team interactions—How will you start the process, monitor it, and are there any ending or sustaining communication activities? (10 pts)
Unit 9—Thursday November 26th (Thanksgiving!!) No class this week

No Class this week. Everyone should enjoy the week off in whatever way they choose.
Learning Objectives:
After completing this unit, you will be able to:

- Understand the concept of innovation “clusters”
- Become familiar with scouts and listening posts
- Grasp why and how a company needs to cast its listening net very wide to take advantage of science and technology advances wherever they are
- Understand how an internal “matchmaker” can be crucial in a foreign country where you don’t know the language, the customs, the laws etc.

Assignments to be completed before Thursday. 12/3/09,

Assigned Reading:
2. BWW Group: Strategic Framework for Global Innovation to Enhance the Efficiency of Global R&D, in Managing Global Innovation, P677

Assignments to be completed before today

1. Explain in your own words, Michael Porter’s definition of technology and innovation “clusters” and why they are so important to the R&D process. Give at least 3 examples NOT already covered in the text. (20 pts)
2. Explain the difference between “home-based augmenting” or building entire research laboratories and “home based exploiting” or technology listening posts. Give the advantages and drawbacks for each. (20 pts)
3. Relative to the introduction of new products, give the role and time horizon for “trend scouts.” Who are they, what do they do, and what do they supply to the corporate strategy? (20 pts)
4. What issues does a technology outpost face? What time horizon do they operate with, and what contribution do they make to new product development? (20 pts)
5. Your team project will have to identify and establish a working relationship with foreign technology institutions. Explain the role of a “match maker organization” and how it can be useful to global R&D. (20 pts)
Unit 11- Thurs., December 10, 2009 Managing the R&D Interface—Technology Versus Market

Learning Objectives:
After completing this unit, you will be able to:

- Understand the difference between strategy driven technology and technology driven strategy
- Be familiar with the “filter” function and understand how even understanding what questions get asked has tremendous influence on the eventual commercial product of technology
- Know the difference between BIG R and little d, and little r and BIG D.
- Explore the concept of separate and co-located R&D corporate labs and operational development centers

Assignments to be completed before Thursday.
12/10/09,

Assigned Reading:
1. Managing Global Innovation: Chapter II.3: Managing the International R to D Interface

Answer the Following questions based on the reading assignments

1. In Managing Global... the authors indicate there are “...companies with strategy-driven technology...or companies with technology-driven strategy...” Explain in your own words what is meant by these two forms, and in your opinion what is the best approach for driving the company and the R&D organization. (20 pts)

2. The text refers to 3 functions that R&D must fulfill, the first of which is “...ensuring the right questions are asked.” Considering the importance of staying on the competitive leading (or even bleeding) edge, explain a) why this question is so crucial, and b) why accomplishing this may be a real problem using only in-house knowledge or capabilities. (20 pts)

3. What is the difference between R (research) and D (development)? Be sure to explain their prime motivations, and their “deliverables” and their “customers.” (10 pts)

4. The text gives several reasons why R&D are not to be co-located. Actually this is a very controversial statement. It has been commonly accepted in past years up through the 1980’s, but now more and more organizations are endeavoring to locate their R&D in the same location. What are the benefits and the dangers of separating your research organization geographically from the operations engineering development? (10 pts)

5. Consider the Graph in Fig II.3.5 on P193. Explain the different management styles depicted there, and why they are appropriate. Do you agree? (10 pts)

6. The text asserts that funding is the major controlling element for R&D and then refers to 2 different models for it. Explain the differences between the “sponsored research” model and the “R&D driven research” (20 pts) model.

7. Write a short summary of what you will personally take away from the class... what you liked... and what might be done differently. (10 pts)