

INNOVATION AND TECHNOLOGY MANAGEMENT

Spring 2014 Management 511

Introduction to Innovation and Technology Management for Products, Processes and Services in National and International Markets

Technology, Innovation, and How to use it: *The Road Less Traveled*



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 Aug 18, 2013 - Dec 13, 2013

Office Hours: Monday (5-7) Wednesday before and after classes by appointment

Class times and places

Wednesday 9:30 AM-12:00 PM GSM Room 1068 4:00PM – 6:30 PM GSM Room 1068

ASM Data files location on UNM learn: files used in this course (syllabus, power point slides, etc) can be found at: <http://mgtclass.mgt.unm.edu/WalshS/>

I. Course Objectives

General Methodology:

Our professional students will work first on a case and next with a real business in order to assist them on specific Technology Management issues. The real world case will continue in the international segment. The mentor based class will develop in the students the ability to understand the issues in and utilize the methods (tools) businesses need in order to effectively manage innovation and technology. We have a number of firms that are willing to work with the UNM top ten ranked in North America Management of Technology and Innovation program (MOT) and we are developing one here. We will initiate the course with an introduction of the methods that modern innovation management requires.

We will use them first in the Nintendo Wii case and then apply them to an actual innovative New Mexican Firm. The innovative firms name is Team Technologies and we will be interacting with a Anderson MOT MBA graduate *Robert B. Sachs* their President & CEO. His email is bob.sachs@team-technologies.com. The company's web link is www.team-technologies.com.



I understand that this is one the first classes that you will be asked to be creative in. I will provide as much structure as possible but unlike engineering projects there are no “black and white” answers rather constructs that when used proficiently provide exceptional results. We give bounds but not answers.

Course Objectives:

- Our student professionals will learn from cases and techniques as well as the president, vice presidents and directors of firms by focusing on technology management problems important to them.
- We will work in teams and will have to view ambiguous data and information in order to generate information and knowledge for the case and the firm.
- We will work with a firm that is involved in one of the largest industries in New Mexico
- We will initiate our experiential leaning on the Nintendo case.
- The two biggest factors for corporate success both in for-profit and non-for profit industries worldwide are technology change based innovation and internationalization. This course is designed to provide the first step in these strategically critical corporate activities.
- Most young professionals already understand that the basis for business opportunity is change. In this class you will learn that the biggest change agent in business is technology based innovation.

- You as professionals will be initiated to a mind set as well as a tool set that will enable you to correctly select and use quantitative and qualitative analysis required to provide organizations value.
- Students will use interaction and discussions about the case and real life firm with their team members and the entire class in order to present and defend their arguments.
- Students will use both team experience and individual efforts to embrace some of the fundamentals of management of technology and innovation.

Due to the varied pathways that you will and have utilized to become professionals you have differing skill sets. Some of you will have prior experience in the difficult task of trying to manage technology and innovation and others will not. I hope that those of you that have some management of technology experience will share your expertise with your classmates. This will not only enrich the class but I believe you will find that it enhances your own understanding of the material.

This leads to another class issue - the duality of education needs and expectations. A large segment of any given graduate class will want to move quickly and thereby cover more material whereas other segments of the class will want to move less quickly and probe deeper into the material. I will aim to address the needs at the interface of these two groups.

Our readings and tools will focus on the field's foundational material as well as newer thoughts. I will as well post more advanced readings for those who are interested in a particular subject matter. You will need to individually and in groups take time each week to further improve your abilities that this education provides. Just interacting in class will not suffice for an effective educational experience.

II. **Nature of the Course**

The essence of **Business Opportunity** is change. The largest single change agent in business today is **Technology**. The biggest emphasis in today's business is **Globalization**. The process of innovation is how firms manage these changes. We provide the executives we teach the opportunity to develop a **mind set as well as a tool set** that will assist them in managing the technologies and innovation processes that form the basis of firm and regional competition.

The company and case we review will be developed over a three to four week effort. The case will have a three week effort and the real life firm a four week effort. The first week we will introduce you to the course, many of the techniques and review the case. We follow this by an in class lecture for the first hour of the second class followed a mentored working session in our groups. The third week we fine tune our effort. The fourth week you will present your findings. The second firm class effort will be a three week effort.

We will focus on providing you the tools you need for each specific firm task. We provide you an introduction to some of the basic "Newton's Laws" of the the Management of technology and Innovation you would obtain if you choose MOT as a concentration. There are many tools and practices to learn and apply and they can be developed through embracing the management of technology and innovation concentration. The basic knowledge is provided below.

"Newton's Laws" for the Management of Technology and Innovation (MOT)

1. Solow won a Nobel Prize by demonstrating that technology and its management was the factor that increased each country's GDP output differentially and in every case at a rate faster than just the combination of labor and capital predicted by earlier economic theory (Solow 1956). Technology is the fuel for innovation
2. Technology and Innovation are effected by and effect strategy at the firm, country policy and cluster levels (Ansoff & Stewart 1969, Friar and Horwitch, 1984).
3. Managers are uncomfortable with technology and innovation being important strategic factors (Christensen 2009). (article on learn)
4. You cannot manage what you cannot measure and you cannot measure or manage what you cannot define.
 - Specifically in MOTI there is exceptional misuse of basic terms such as innovation, technology, technology change, and product causing confusion at every level (Yanez et al. 2010). (article on learn)
5. The design of an organization is directly affected by its technology product paradigm. Specifically Materials, Service, and Fabrications & Assembly (F&A) tend to organized different from one another (Wood 1956).
6. Change is the single largest opportunity agent in business. Technology is the biggest change agent in the world - past, present and future (Almost everybody since Adam Smith 1776).
7. The process and product innovation sequence is different in each of the generic technology product categories (service based firms vs. Materials based firms vs. F&A based firms. This causes effective management practice to be radically different in these differing categories (Abernathy and Utterback 1988, Barris 1994, Linton et al. 2003).
8. An exceptional opportunity might not be an exceptional opportunity for you or a given firm due to the differences in training and experience in differing technology product categorization. (Fusfeld 1978, Linton et al. 2010).
9. Recognizing technology based opportunity is a pathway to business venturing (Schumpeter 1942).
10. Technology change effects all service product and physical product businesses (Rosenbloom 1978, Kirchhoff et al. 2013).
11. Technology learning curves are one of the most important physical and service product strategic tools and are sensitive to a firm's technology history (Wright 1938, Foster 1986, Linton et al. 2002).
12. The potential strategic impact of a technology is defined by its continuum from sustaining to potentially disruptive (Christensen 2004, Kirchhoff et al. 2001,).
13. Individual firms have a preferred innovation pathway which is linked to the disruptive or sustaining nature of the technologies they employ and the firm's penchant for market pull versus technology push innovation strategies (Marquis 1969,).

14. Product commercialization strategies are exceptionally different for products that do not require substantial customer change to use them versus those products that do require substantial customer behavioral change (Kirchhoff et al. 2004).

15. Managing R&D is a task designed to reinvent the corporation and start new firms and can not be managed by ROI based metrics alone (Mechlin and Berg 1980).

16. Managing Technology's effect on internal and industrial value chains creates business opportunity (Linton et al 2010).

17. Technology change alters the dynamics of the five forces which govern industry profit potential (Porter 1980, Berg et al. 2009).

These 17 Newton's Laws of MOT are but a few of the basic knowledge areas in the field others include technology forecasting, technology road mapping, technology project management, and many more that you will have to embrace as a professional. They can be developed through the embrace of and MOTI concentration. In our eight classes together you will be introduced to some of these concepts with the goal to help you become the exceptional manager that will be both vertically and horizontally mobile.

III. **Book and Materials**

1) Case to be purchased on line from HBR

Wii Encore? HBR 9-712-416

Purchase online link is <http://hbr.org/product/Wii-Encore-/an/712416-PDF-ENG>

No Book: Articles and slides provided on our web.

UNM Learn Data Files: All outside readings, the syllabus, PowerPoint slides, outside etc. can be found at:.

IV. **COURSE REQUIREMENTS (EVALUATION CRITERIA)**

General

Students will be evaluated based on a combination of written firm analysis, presentations to the class and firms and a quiz. This is a hand's on course learning experience. After the first five classes, I will provide a feedback form to you in order to get your feedback concerning the progress of the class. The companies are involved in the evaluation process.

Requirements

You will be graded on participation, group presentations, and a quiz.

Evaluation Policy

Your final grade is based on your performance in the following six areas with the following point distributions:

25% Case written assignments

30% Live firm analysis

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- 20% 1 Presentations
- 20% 2 Individual quizzes taken on UNM learn
- 5% Participation

The course letter grades will be determined after the completion of the semester. I do assign fractional grades (Grades for the MOT section) rather you will be graded on the course as a whole. Major breaks in ranked total scores will determine the cutoffs between letter grades. Remember that teams can help you learn and they do create supportive learning environments but as a professional you must also perform individually.

Students with Special Needs: If you are a qualified person with disabilities who might need appropriate academic adjustments, please communicate with me as soon as possible so that we may make appropriate arrangements to meet your needs in a timely manner. Frequently, we will need to coordinate accommodating activities with other offices on campus.

Firm effort outline

A. 2 Firm Written Analysis

All members of the student groups should prepare the analysis of the Firm assigned in the syllabus. Both firm projects need to be submitted. Format: no more than 10 pages typed, 1.5-spaced. You should provide attachments showing your tool work. The groups will be comprised of 7 or 8 team members. Desired write-up structure: use headings and appendices

1. PROBLEM STATEMENT: *Primary/Sub-Problems*

In the problem statement, pick an issue that is a central theme presented by the firm officers. There is usually more than one; state them, and then choose one problem that will guide your case write-up. (1 to 2 sentences)

2. SHORT SUMMARY OF THE FACTS: *Usually only a paragraph*

State the facts from firm handouts and website that are relevant to your problem statement. This section should build on the first.

3. ANALYSIS OF THE FACTS: *Utilize the tools to go beyond the stated facts*

State why you use the tools you do. Utilize the tools presented in this course that are specific to the firm's issue. Organize the facts relevant to the case. The analysis should point toward the alternatives and recommendations that follow. This is the "meat" of the case study and should be your longest section. Please show all tool analysis with the appropriate diagrams, graphs, etc.

4. ALTERNATIVES: *A range of possible ways/methods to resolve the identified problem*

Each company faces a decision point. You, as an analyst, must put yourself in the situation as the decision maker or staff analyst and come up with reasonable alternatives (3 perhaps) the firm could pursue.

5. RECOMMENDATIONS/SOLUTIONS: *Selection of an alternative and the underlying rationale*

Your recommendations should be a solution to the firm's indicated problem. The facts and your analysis should support your recommendations.

Note: Maintain a consistent theme in the write up. This real life management problem does not have complete information. Make reasonable stated assumptions and speculate. Be consistent and cogent. Further prepare all analysis using the tools and show your work in an appendix.

Warning: *DO NOT KEEP REPEATING THE FACTS!*

B. PRESENTATION by student groups

Each group will be required to prepare each firm's analysis and present it to your fellow executives and the firms. Since each team will comprise 8 team members we will split each group in half for presentations. The first half will present to the case and the second half will present to the Firm. Further details will be provided at the first class session. The presentation should be a maximum of **fifteen minutes plus 5 minutes for questions be innovative in presenting.**



"I'm Happy to give you innovative thinking. What are the Guidelines?"

C. On line Learn quizzes

The Quiz is designed to assist the student reading and is composed of 5 multiple choice or yes/no questions and 1 written 500 to 600 words (or so).

D. Class participation

If you show up 50%, If you then respond to relevant questions 75%, If you are proactive in effort your cases applying the tools 100%. No class grade in the first week. We drop you lowest grade.

Tentative Course Outline

The exact nature of each class session is often difficult to predict. Further, this is the first time we are using a combination of a case and a mentored real company approach for our core class. So, please expect some changes as we move through the course based on the interest and varied abilities of our executives as well as our ability to cover the material. Any revisions will be posted on the UNM Learn website in course data files.

The classes slides, readings and cases will be in UNM learn under Mgt. 511. However the slides are only a skeleton meant for you to enter input during the lecture and discussion portions of the classes. Remember this is an Executive mentored learning class so interact

Read assignments before coming to class

The first day of class we will provide material for at least your first company. During each class day we will take breaks to insure interaction. Each break will last approximately 15 minutes and there will be as a rule 1 per class. There are four types of classes in our mentored program.

They are: (1) interaction at the case or firm under review; (2) lecture and mentorship centered on the issues presented by the case or the firm to the class; (3) fine tuning our effort; (4) presentation of work to the firm and final project papers due. Each interaction of the firm class will as well have relevant articles and tools for students to review. Each mentorship class (2) will typically be comprised of, a short review of the problems under discussion. The group presentations to the firms and the 10 page reports will be delivered on day four for our first company (fifth glass) and the third class of the second company or week eight (8). Each presentation will be provided by 4 of the 8 group members. This means that each person in the group present only once.

Class 1 – August 20, 2014

Introduction, Objectives, Style, etc.

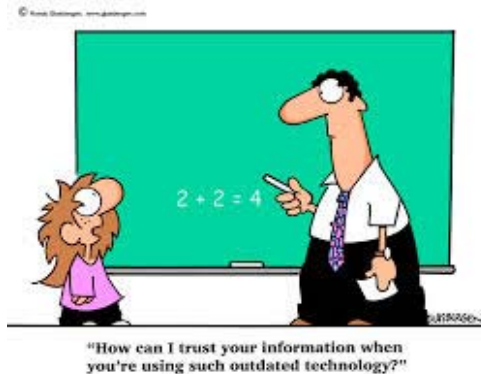
Tools and Notes, Class 1, Basic Concepts

The introduction of the course to the class. The initial case, tools and readings will be introduced. We provide a brief introduction to the basic language around innovation, competitive advantage and technology management. We choose teams and representative from those teams to present. Two different members from each team are expected to meet the client firm representing their group. We meet at their facility. The other of up to six members of each group will meet at class time to review specific tools. Here are the discussion tools for the first week

- 1) Technology, product, technology change & Innovation definitions
- 2) Physical product and Service product differentiation – Mr. CHIPS
- 3) Manufacturing and Service product technology paradigms generic categories
- 4) Process versus product innovation in the generic product technology paradigm categories
- 5) Expeditionary marketing

Activity:

Choose teams



Case under review

Nintendo Wii Encore?



Reading

- 1) Yanez, M. Tarek M. Khalil, Walsh S. T. (2010), "IAMOT and Education: Defining a Technology and Innovation Management (TIM) Body-of-Knowledge (BoK) for graduate education (TIM BoK)," Technovation, Volume 30, Issues 7-8, July-August, pp. 389-400

(this is on UNM Libros)

- 2) Wii Encore?



Class 2 – August 27, 2014 – Basic Concepts (tools) to manage Technology and Innovation

- 1) Core Competence/Core Capability
- 2) Marquis - Anatomy of successful Innovation
- 3) Strategic Firm Fit Audit
- 4) Sustaining vs. Disruptive Technologies
- 5) Discontinuons vs. Continuous Innovations



Readings:

Outside reading: *From Bench to Business* (In UNM Learn) (2003)

Outside Reading: *Strategy Technology Firm Fit Audit* (In UNM Learn) (2010)

Outside reading – *The Anatomy of Successful Innovations* (In UNM Learn) (1969)

Outside Reading: Core Competence of Corporation (Prahalad and Hammel 1990)

Activity:

Discuss Life after Wii and how to use tools

Question: What does Nintendo do now?



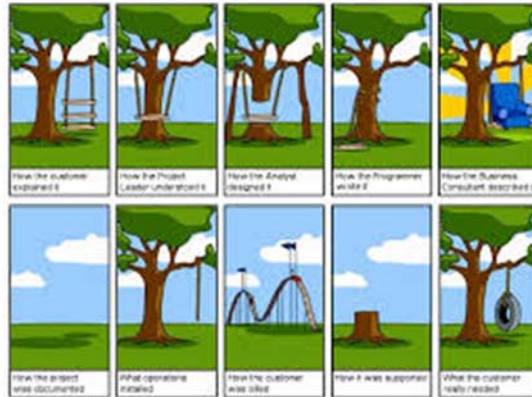
Class 3 – September 3, 2014 – Trip to Team Technologies
Guest in class Lecturer – Dr. Yorgos Marinakis

Introduction to the second case

Some go see Team technologies

Others start new tools with Professor Marinakis at school

Bob Sachs CEO of Team technologies speaks and discussion interactions
 Travel to company



Two sessions at Team technologies
1 in morning 1 in afternoon

In Class Discussion

Schumpeter's waves

Wii

Newton's MOT Laws

Brief touch on a New Tool

Technology Life Cycles



Class 4 – September 10, 2014

Small quiz on learn for some tools and Wii Encore due before class is initiated

Mentorship class on Wii Encore

Video Clip

Innovation and Spaghetti

(http://www.ted.com/index.php/talks/malcolm_gladwell_on_spaghetti_sauce.html) (2007)

New Tools

Technology Market Matrix / Portfolio theory

Technology Life Cycles

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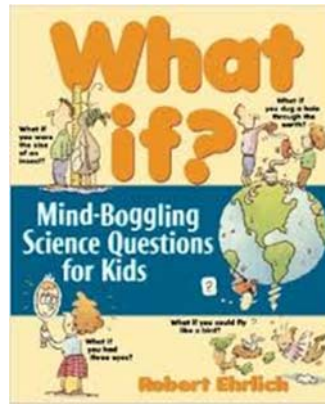
The Chasm
Lead User efforts

Readings:

TMM handout on UNM learn
Lead User online
The Chasm on Learn



Class 5 – September 17, 2014



Written material due and presentation
Presentation done by ½ of each group

Video Clip

Juan Enriquez shares mindboggling science

http://www.ted.com/talks/lang/eng/juan_enriquez_shares_mindboggling_new`science.html

Reading



Class 6 – September 24, 2014 – Mentorship class on Team Technologies

Second Small quiz on learn for the rest of tools and Team Technologies due before class is initiated

Tools and Notes –

Five forces and technology
Lead User

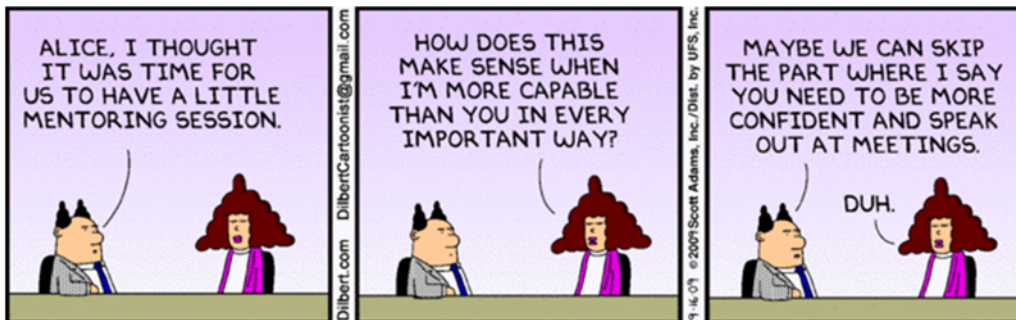


Hand in take home Quiz

- Eric Van hippel
 - Watch video : <http://www.leaduser.com/>

Readings on learn

Class 7- October 1, 2014 *Mentorship class on Team technologies*



Class 8 – October 8, 2014 – Presentation to to Team technologies

Hand in hard copy
Of the 2nd written assignment and Presentation



Code of Conduct: Please switch off your phones when in class (I am sometimes the worst offender). Surfing the web or playing games on computers during class is in general frowned upon. Please remember this is a case based class and class participation is critical. Please see your student handbook for the definition of plagiarism that we use. Keep your presentations to the agreed upon lengths. In general, be respectful to others.