Management of Technology based Organizations

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Course Description

Management, as we know it today, has been the subject of study and practice roughly for the last 100 years. Some people think that a good manager can manage anything, regardless of its technological base. But there is strong evidence that the ability to evaluate alternative technologies and their investment requirements, the capacity to envision how scientific and technical concepts find their way to the market, and the knowledge about how to manage complex innovation and production processes, all require a distinctive set of skills.

In this course, we will look at what these skills are. Many cases will be studied, of both successful and failed technology based projects and enterprises. By the end of the course students are expected to have developed their own criteria about how Technology based Organizations must be managed.

THIS IS NOT A COURSE ABOUT TECHNOLOGY. Rather, it is a course about the skills required to MANAGE technology based organizations. The focus is on ESTABLISHED ENTERPRISES (large or small), it is NOT on startups.

Objectives

- Learn what a **Technology based Organization** is.
- Learn about the main **differences** between **managing a Technology based Organization** and other types of organizations.
- Understand the **Innovation Process** in established organizations. Also, learn about the main approaches to manage the Innovation Process.
- Learn how to **take decisions** regarding Innovation projects
- Review how technology organizations are **organized**.
- To understand basic **Project Management**.
- Learn how to **manage risk**

Methodology

The course is divided in eight parts, each part covering a different topic about management of technology based organizations (large firms or startups). For each topic, a combination of the following will be used:

- **Lectures** – Students will be presented with contents about the major topics covered in the course.

- **Weekly Assignments** – Assignments will be given BEFORE each topic is presented. Therefore, students are not expected to provide a right or wrong answer for each assignment, but are expected to think about the main issues of each topic.
- **Class discussions** – Many cases will be discussed through the course. Maximum benefit for the student will be obtained only if each case has been prepared by previously doing the corresponding weekly assignment.
- **Readings** – A list of recommended books and papers is provided in the present document. In addition, other sources may be referred during the course.
- **Videos** – When available, relevant videos will also be viewed, as additional materials for the class discussions.

Evaluation criteria

The final grade of the course will be computed as follows:

– Assignments and class attendance		50%
– Final exam		50%
	Total	100%

Students are required to attend 80% of classes. Failing to do so without justified reason will imply a Zero grade in the participation/attendance evaluation item and may lead to suspension from the program

As with all courses taught at the UPF BSM, students who fail the course during regular evaluation will be allowed ONE re-take of the examination/evaluation. Students that pass any Retake exam should get a **5 by default as a final grade for the course.** If the course is again failed after the retake, students will have to register again for the course the following year.

In case of a justified no-show to an exam, the student must inform the corresponding faculty member and the director(s) of the program so that they study the possibility of rescheduling the exam (one possibility being during the "Retake" period). In the meantime, the student will get an "incomplete", which will be replaced by the actual grade after the final exam is taken. The "incomplete" will not be reflected on the student's Academic Transcript.

Plagiarism is to use another's work and to present it as one's own without acknowledging the sources in the correct way. All essays, reports or projects handed in by a student must be original work completed by the student. By enrolling at any UPF BSM Master of Science and signing the "Honor Code," students acknowledge that they understand the schools' policy on plagiarism and certify that all course assignments will be their own work, except where indicated by correct referencing. Failing to do so may result in automatic expulsion from the program."

Calendar and Contents

Week 1:	**PART I – DEFINITIONS** Introduction. Definitions: Innovation, Technology Based Companies. Moore's law. Why is innovation relevant to CIO's. References. The Innovation Process. Stage-Gate. Concurrent Engineering. Stage-Gate/Agile. The Myths of Innovation. - Andreas Bechtolsheim – The Process of Innovation (Video) Assignment: WHY DID NOKIA FAIL?
Week 2	**PART II – WHERE DO INNOVATIONS COME FROM** Where do Innovations come from – I - "Technology Push" MIT Deshpande Center (Video) - "Market Pull" Iridium - Reverse Innovation Assignment: THE TATA NANO: SUCCESS OR FAILURE?
Week 3	Where do Innovations come from – II - User Lead Innovation at 3M (Video) - Recombinant Innovation: IDEO (Video) - Copying: Google - Open Innovation Assignment: TESLA MODEL 3. WILL TESLA HIT ITS TARGETS?
Week 4:	**PART III – INTELLECTUAL PROPERTY** How to protect Innovations – Intellectual Property Patents Copyright Trademarks Industrial Secret - Software Patents Debate - Free Software and Open Source Software Assignment: SOFTWARE PATENTS
Week 5:	**PART IV – PROJECT EVALUATION AND SELECTION** Project Evaluation and Selection. The Marketing Plan. The Business Plan. The Project Proposal. Decision Criteria: quantitative and qualitative. - Is it Real, Can We Win? Assignment: BUG LABS
Week 6, 7	**PART V – PROJECT MANAGEMENT** - Modern Project Management - The Formal Project Management System. Tools and Techniques - Project Organization - Multi-cultural Project Management Assignment: GANTT, OBS and WBS
Week 8:	**PART VI - MANAGING RISK** Collaboration Strategies. - Siemens Mobile. Organizing to Innovate - Functional vs. Matrix Organization. The Ambidextrous Organization - Xerox PARC. - Why Corporate Skunk Works need to die Assignment: READ THE IBM CASE
Week 9:	**PART VII – INNOVATION AND BUSINESS STRATEGY** Innovation & Business Strategy - Emerging Business Opportunities at IBM. - 3M
Week 10:	Course Summary. Exam

Reading Materials/ Bibliography/Resources

RECOMMENDED TEXTBOOKS

Schilling, M.A., *Strategic Management of Technological Innovation*, Mc-Graw-Hill, 2013

Trott, P., *Innovation Management and New Product Development,* Pearson Education, 2008

Tidd, J and Bessant, J. (2014) Strategic Innovation Management, John Wiley & Sons Ltd.

Thamhain, H.J., *Management of Technology*, John Wiley & Sons, 2005

Scott Berkun Lecture: The Myths of Innovation,
http://www.youtube.com/watch?v=amt3ag2BaKc

Andreas "Andy" Bechtolsheim: The Process of Innovation
https://www.youtube.com/watch?v=08frKEAtav4

SPECIFIC REFERENCES ON THE INNOVATION PROCESS

Stage-Gate International www.stage-gate.com

Vedsmand, T., Kielgast, S., and Cooper, R.G.,(2016) *Integrating Agile with Stage-Gate*, Innovation Management.se

Hansen, M.T., and Birkinshaw, J. (June 2007) *The Innovation Value Chain*, Harvard Business Review

WHERE DO IDEAS COME FROM

Reverse Innovation

Immelt, J.R. and Govindarajan, V. (Oct 2009), *How GE is Disrupting Itself*, Harvard Business Review

TEDxBigApple - Vijay Govindarajan - Reverse Innovation
http://www.youtube.com/watch?v=ztna1lt_LZE

Managing Innovation, Chapter 5

Chesbrough, H.W. (2009), *Open Innovation*, Harvard Business School Publishing Corporation

Batelle, J, (2006), *The Search*, Penguin Group

Smith, D.K. and Alexander, R.C, *Fumbling the Future*, William Morros & Co. 1988

PROJECT MANAGEMENT

Guido, J., Clements, J, (2014, 6th Ed.) *Successful Project Management*, South-Western College Pub

INNOVATION EXAMPLES

Lynn, G.S., Reilly, R.R., *Blockbusters,* Harper Collins, 2002

Easton, J., *StrikingItRich.com*, McGraw-Hill, 1999

ENTREPRENEURSHIP

Blank, S. and Dorf, B (2012) The Starup Owners Manual, K&S Ranch Publishing Division

Osterwalder, A. and, Pigneur, Y (2010), Business Model Generation, John Wiley and Sons

Steve Blank's web *steveblank.com*

OTHER REFERENCES

Surowiecki, J., (2004) *The Wisdom of Crowds*, Random House

Harford, T., (20011) *Adapt,* Little Brown

Bio of Professors

Xavier Castillo obtained his Telecommunications Engineering degree from UPC in 1976, a M.Sc. in Electrical Engineering from CMU in 1978 and a Ph. D. in Electrical Engineering (Computer Engineering) in 1981 also from CMU. Later he obtained an MBA from IESE in 1988, and a BA (Honours) in Humanities (Music) from the Open University in 2009.

During the last forty years, he has held several executive management positions in IT and telecommunications companies, including Data General, BT, Retevision and Tempos 21. He has also worked at AMETIC, the Spanish ITC Trade association.

Dr. Castillo has been teaching regularly at La Salle and the BSM/UPF.