

Fall 2003

12 pages

**AUBURN UNIVERSITY**  
**Thomas Walter Center for Technology Management**

**COURSE:** BUSI 4540: Strategic Management of Technology and Innovation  
Subtitle: New ventures, new product and process development

**TIME/room** MW 3-4:15 p.m., Rm. 033 Business Building

**Instructor:** Prof. Paul Swamidass

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**URL** [www.eng.auburn.edu/center/twc/pms.html](http://www.eng.auburn.edu/center/twc/pms.html)

**Office hours:** T 10-11:30 AM and by appointment.

**Required Texts**

1. Ettlie, J. E. *Managing Technological Innovation*, New York: John Wiley and Sons, 2000 (paperback).
2. Swamidass, P.M. *Innovation in Competitive Manufacturing*, AMACOM Books, 2002 (paperback)
3. **A packet of cases from the bookstore. (McGraw-Hill publication)**

**Library Reserve (one chapter in E-reserve)**

4. Utterback, J.M. *Mastering the dynamics of Innovation*, HBS Press, 1996 (paperback)—(could be bought for less on the Internet)—not in AU bookstores

**COURSE DESCRIPTION**

Theme: “Think like an upper-level manager in regards to technology and innovation.”

Scope: Issues in new ventures, new product and process development.

Goal: The goal of the course is to (1) expose students to items covered in Scope above, and (2) to change the way students think in the context of technology and innovation. It includes changes to the way you use data, and the selective use of data. Specifically, the student is given the opportunity to (1) make decisions using a broader perspective, (2) deal with risk, (3) recognize critical issues in a sea of data, (4) develop critical thinking, (5) select data for making inference and decisions, (6) think independently, and (7) work in teams.

This course addresses major conceptual and practical issues in the area of technology and innovation. In this course, several cases are used to simulate real-life decision environments. Case analyses are akin to “connect the dots” puzzle, except that you are not given the dots, you need to select the right set of dots

from a sea of dots. While case analyses are challenging (i.e., difficult), they provide opportunities for complex problem solving. Expect to spend several hours per case outside the classroom.

Films will be used to provide insight into real-life companies, their practices and managerial thought process. Some films will serve the purpose of video-based cases. The discussion following the films will be patterned after the discussions of print-based case analyses. The films provide a foundation of strategies for imitation.

Technological innovation in businesses occurs routinely in the context of product development. Product development must concurrently address engineering as well as business issues. Therefore, business and technical aspects of product development in real companies are addressed through real-life case studies and films. Outside of product development, process development is closely involved with technological innovation in businesses. A broad definition of process technology is process know-how, which could be resident in a machine, in people, or procedures or a combination of the three.

To assist you with case analyses, read: *How to get the most out of cases?* by Paul M. Swamidass. Classroom discussion may include student presentations and/or class discussions. Class discussions will rely heavily on questions and answers. Seemingly endless questions and answers are intended to help the students to discover the answer(s) or approaches they already know, or enable them discover the answer through a process of critical thinking. Some call this “learning through discovery.”

The schedule for the course is such that it requires a steady effort. The **five written case analyses that are due out of a total of 6 assigned cases marked with \*\* or \*** give you some flexibility in planning your deliverables. Cases marked \*\* must be done by all, pick any two from cases marked \*. In addition, some assignments based on film cases. All deliverables and due dates are identified in the outline to enable you to **plan for and work on all the deliverables from the very start of this course.**

### **Prerequisites**

The student taking this course should have successfully completed BUSI 3530 and BUSI/ENGR 3520 and is a student of good standing in the BET program.

### **Department and College Policies**

Taking the course without the declared prerequisite is a violation of the honor code and college policies. Upon detection, you may be dropped from the course without any further warning--you may forfeit any tuition paid--and you will not be eligible for a grade. You must have a GPA of at least 2.2 to be enrolled in a course offered by the College of Business. Anyone found cheating in the course will be dealt in accordance with the procedures outlined in the *Tiger Cub*. If you have an AU approved disability, see the instructor and discuss your case.

### **Written Case Analyses**

Minimum 500 words. Written cases analyses are due from students before the class on the date scheduled. The pre-class analyses are based on a student's individual effort, and rests on the required readings for the course, or any reading of the student's choice. Later, when the case is discussed in the classroom, various student analyses and teacher's analysis will be combined. Once a case is discussed in the class, no written case analysis for credit is acceptable.

### **Films**

Make notes of educational and case films in the class.

**Attendance**

Classroom learning is a substantial portion of the learning that occurs in this course. Attendance is therefore required. Three absences are excused without any consequence, however, you are responsible for the work and content covered on days you were absent. Each absence after the first three will result in 1 percentage point reduction from your course total.

**SCHEDULE**

**Codes:**

- A = The text: *Innovations in Competitive Manufacturing*
- B = The text *Managing Technological Innovation*
- C = The packet of cases for BUSI 4540 from the bookstore.

Handouts or Internet source (marked \*\*\* in the schedule):

- a. Napster files for bankruptcy-- <http://www.kansascity.com/mld/kansascity/news/3391214.htm>
- b. Managed Innovation: 3M's Latest Model for New Products  
<http://www.manufacturingnews.com/news/editorials/shor.html>
- c. Dell Direct Model
- d. Six sigma : <http://www.asq.org/pub/sixsigma/motorola.html>  
<http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.pyzdek.com/101.htm>  
[http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.deltagr.com/case\\_studies.htm](http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.deltagr.com/case_studies.htm)  
<http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.npd-solutions.com/apuppm.html>

All case analyses are due at the start of the class or earlier.

- (\*) These cases are candidates for **five required** written analyses for grading.
- (\*\*) Everyone must do these cases—will count towards the **required five** written case analyses. Four cases are marked \*\*, thus you can choose to do any one of the remaining two marked with (\*).

Date	Description	Readings
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**NOTE:** Take notes of key points while viewing films. Some films are used as cases studies that are followed by in-depth analysis and written assignment.

**I. Technological Innovation, Startups and Innovators**

Aug 20	Topic: Introduction, Definitions and Ethics Read: Does technology matter? What is strategic thinking? Technology strategy Innovation, incremental, radical Core competence	B (p. 5, 8) B (93-95, 109-111) B (42, 43) B (38-40)
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Aug 25	Topic: Startup, Innovators Case <b>Film: Jerry and Dave's Excellent Venture</b> (Note: Make notes for future use when viewing all films in this course—summarize the lessons from each film. In this film, make note of: Key milestones, why was this a successful venture, key technology decisions and business decisions; lessons to take with you)	
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Note: Read about the term project (clinical study) described later and begin work.

(Students assigned to teams)

Aug 27 Topic: Invention, innovation and how-to on startups.  
**Film: Invention—Need, Idea, Patent, copyright, trademark**  
**(Notes: ....)**

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Sept 1 Labor day --holiday

Sept. 3 **Film: prototype, patent documentation, patent examination, non-disclosure agreement, Patent attorney, marketing your invention**  
**(Notes.....)**  
**Read:** Napster files for bankruptcy – Yahoo News, Monday June 3, 2002 \*\*\*  
<http://www.kansascity.com/mld/kansascity/news/3391214.htm> or any other site on Napster  
**Individual Assignment I: Conduct research and write an essay titled, “The legal and technical reasons for Napster’s bankruptcy and lesson from the bankruptcy.” Due today—Minimum 500 words, single-spaced.**

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Sept 8 Topic: Innovator  
Case **Film: The view From the Top (Intel)**  
(Notes: Lessons?)  
Read: Innovative Intensions and complete the questionnaire B (p. 66)

Sept 10 Topic: Startup, Innovator  
Case **Film:** Sky Dayton: 1999 Entrepreneur of the year  
**(Notes:** Key events, reason for success, the entrepreneur, technology issues and business issues to overcome, lessons?)

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Sept 15 Guest speaker: Intellectual property rights—Dr. Brian Wright (TT Officer, AU)

Sept. 17: Commercialization of technology  
\*\*Case: Nylon recycling technology commercialization Handout  
(case analysis due)

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**II. Product Development**

**Product Design and Development**

Sept 22 Topic: Issues in product design and development  
Read: Chapter 22: Concurrent engineering A  
Read: Chapter 32: Target Costing A  
**\*\*Case: Plus Development Corp.** C

Sept 24 Topic: Fundamentals of product development  
Read: New product development (NPD) B; 203  
Time compression in NPD B (p. 205)

**Case Plane Crazy Film, volume I**  
**Project proposals due today—e-mail will do**

(After viewing all three volumes, you are expected to give a written report—Assignment I-- on the date shown later in the schedule. **Individual Assignment II: Title of report is, “Lessons for product development from Plane Crazy films.” Typed, single-spaced, 1000-1100 words long. Due on Oct. 6) Read Assignment II requirements at the end.**

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Sept 29      Read; Successful product      B: 220-221  
**Case: Plane Crazy Film, Vol. II**

Oct. 1      **Case Plane Crazy Film, Vol. III**  
**Read:** Seven myths of NPD      B: 206-207

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Oct 6      Topic: Design for manufacturing  
**Film: Design for Manufacturing**  
 Read: Chapter 9: Teams: Design and Implementation      A

**Assignment II due today ”Lessons for product development from Plane Crazy films.” Typed, single-spaced, 1000-1100 words long—see end of outline for details.**

Oct 8      Topic: Introducing innovations in product development  
 \*Case: BMW AG: The digital auto project  
 Film: **BMW AG: The digital auto project**

**\*\*\*mid semester Oct. 9\*\*\*\*\***

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Oct 13      Topic: Selected approaches to product development/teamwork  
**Read:** The platform approach to product development,      B (p. 212-214)  
 Read: Chapter 23: Mass customization      A  
 \*Case: **Quantum Corporation: Business and Product Teams\***      C  
 Case number 9-692-023

Oct. 15      Topic: Large and complex product development  
**Read: Betting on the 21<sup>st</sup> century jet**, pages 399-343      B  
 Case **Film: 21<sup>st</sup> Century Jet (Boeing 777) Vol. I, 55 minutes**  
**Individual Assignment III**– View Volumes I to III of this video and prepare 1000-1100 word typed, single-spaced essay tilted, “Lessons on large, complex product development based on Boeing 777 launch” Due on: Oct. 21—see end of outline for details.

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Oct. 20      **Case Film: 21<sup>st</sup> Century Jet (Boeing 777) Vol. II – 55 minutes**  
**Read:** Summary, p. 223-4      B  
 Assignment III due on Oct. 21

Oct 22      **Case Film: 21<sup>st</sup> Century Jet (Boeing 777) Vol. III– 55 minutes**  
**Read Assignment III: due on Oct. 21**

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Oct. 27	Case: Dominant Design and Survival of firms, Chapter 2, <i>Mastering the Dynamics of Innovation</i> by J.M. Utterback HBS Press, 1996 Team assignment—Odd-numbered teams only—Write a report titled, “What is dominant design and how to anticipate it: One example from the 1980’s” Due today	E-reserve AU Library
Oct. 29	Case: Invasion of a Stable Business by Radical Innovation, Chapter 7, <i>Mastering the Dynamics of Innovation</i> by J.M. Utterback HBS Press, 1996 Team assignment—Even-numbered team only—Write a report titled, “What is radical design and an effective example from the 1980’s” Due today	Book reserve AU Library

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### III. Process Innovation

Nov. 3	Topic: The evolution of process innovation in the last 20 years Case <b>Film: Direct Dell Model</b> <b>Read: Dell direct model</b> Read: Chap. 1: Innovations in competitive manufacturing: JIT to E-business <b>Assignment III is due:</b> 1000-1100 word typed, single-spaced essay on “Lessons on large, complex product development based on Boeing 777 launch.”	*** A
Nov. 5	Topic: Continuous improvement philosophy and process innovation Read: Is VW’s new plant lean, or just mean? Read: Chapter 15: JIT manufacturing <b>Film : Continuous Improvement (Process)</b>	B: 376 A
Nov. 10	Topic: Innovations in costing Chapter 31: Activity-Based Costing” <b>Film : ABC/ABM – Understanding Manufacturing Costs</b>	A
Nov. 12	Topic: Product/process development and project management <b>**Case : Campbell Soup Company*</b> Case number 9-690-051 Read: Automation Off course in Denver, page 32	C
Nov 17	Topic: Process automation Read Chapter 12: Manufacturing technology use in the US and benefits	A
Nov. 19	Innovations in process and product quality since 1980s Read: Chapter 6: TQM Read: Chapter 7: The Implications of Deming’s Approach <b>Film: TQM</b>	A A

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Nov 24-29 Thanksgiving holidays  
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Dec. 1 **Topic:** Quality and supplier technology capability  
Read: Chapter 27: Supply Chain Management A  
**\*\*Case: Spin Master Toys (A)** C  
**Film : Cost of Poor Quality**

Dec. 3 Topic: Recent Innovations in quality  
**Assignment IV:** Search the Internet for information on Six Sigma quality practices and summarize in a 200 typed single-spaced report—due in class.  
**Film: Six Sigma**  
Read: six sigma \*\*\*

Dec 8 Class presentation of Term Project —25 minutes for each presentation  
Written report on Term project is due from all teams – 2 teams

Dec. 10 Class presentations of term project –continued – 2 teams

Final Exam: Dec. 13: 8:00-10:00 AM (Tuesday)—remaining teams

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**Clinical Study:** Team-based Term Project (Due Dec. 8 from all teams)—team size 4 members, two from business and two from engineering.

Using the readings in the book *Mastering the Dynamics of Innovation*. Pick examples of (1) dominant design in a product, or (2) radical design in a product and describe how it affected (1) an industry and (2) at least company in the industry.

You may use books, articles, the Internet and conversations with managers, etc. to complete this term project.

The report must be typed, double-spaced and may address several items from the list below plus items relevant to the particular project.

1. How did the innovation occur?
2. What is the dominant design or radical design involved?
3. What competitive or strategic impact did it have on the industry and at least on one company.
4. How did companies react to the innovation?
5. Who did the right thing and who did not, why?
6. What are the lessons for the companies studies and all companies in general.
7. Who are the key persons responsible for the innovation? What could you learn from them?
8. Each team member to include in the appendix a statement titled: “What I learned from this **clinical study.**” (10%)

**Notes for Assignments, case analyses and term project.**

Your reports must give title (sometimes specified in the outline), your name or team members' names, date of submission, and the assignment number, or the name of the case, or project. Example:

Course:

Instructor:

Date submitted:

Title of the assignment:

Your name or your team's number and names of team members.

Use subtitles, paragraphs and follow all the principles of good composition learned from your college English Composition course.

Graded as follows:

1.	Content quality, originality and pertinence	70%
2.	Report readability and organization	10%
3.	Thoroughness of the work	20%
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	Total	100%

NOTE DUE DATES

1. Individual Assignment I due date, Sept. 3

**2. Proposal due Sept. 18—team project**

*Each clinical study is different. Therefore, the above list may not fit each and every term project..* Term project **proposal**

To prepare a proposal on the project, identify a reasonable project after reading Chapters 2 and 7 in the book *Mastering the Dynamics of Innovation*, in Reserve Library and E-reserve in AU library. Write a short description (1 page) of what you plan to study, who will provide the information, how you would collect data, the potentials for learning, and the proposed Contents page (required) of your final finished project report (1 page). Your final report should conform to *your proposed Contents page*.

Submit it to the instructor for approval on or before Sep 18. Feel free to discuss with your instructor your ideas. Proceed with your Clinical Study only after it is approved in writing by the instructor. **The purpose of the proposal is to enable the instructor steer you away from inappropriate projects, which may not meet the course requirements.**

**3. Assignment II (Due Oct. 6)—individual**

Watch all three volumes of the film *Plane Crazy*, take notes and prepare the essay described in the schedule for Sept. 18. Title “Lessons for product development from *Plane Crazy* films.” Identify the various distinct stages in product development and the mistakes and lessons from each stage of product development.

**4. Assignment III (Due, Nov. 3)—individual**

View each of the three tapes on Boeing 777 in the class, take notes. Look at all aspects of design, manufacturing, product development, process development, and sourcing of components and then write an essay titled, “Lessons on large, complex product development based on Boeing 777 launch.” Identify the lessons learned at each stage of product development.

**5. Assignment IV (due Dec. 3)—individual**

200-word report on what is Six-Sigma quality process, who started it, and how it is implemented by American manufacturers.

6. Team Assignment due date, Oct. 27, 29

7. Term Project due date, see above

8. Five case analyses are due—various due dates—bring individual analysis to class. Team will prepare an analysis in the class.

**Case analyses**

Read “How to get the most out of cases?” by Paul Swamidass

Case analyses must be typed single-spaced. Limit: 450-500 words. See attached list of questions pertaining to cases assigned for class discussion.

Your analyses could take one of two approaches: (1) Respond in detail to questions assigned for some of the cases, and address issues important to you, or (2) address important issues as you see them.

Bring your typed analysis to class on the date scheduled. Students will analyze cases individually.

**Grades:**

- |   |       |
|---|-------|
| 1. Assignment I (Individual)  | 5%    |
| 2. Assignment II (individual):  | 10%   |
| 3. Assignment III “   | 5%    |
| 4. Assignment IV “  | 5%    |
| 5. Proposal (team)  | 6%    |
| 6. Team term project:   | 28% * |
| 7. Team assignment (Oct 22, 27)   | 10%   |
| 8. 5 case analyses (5x5) (individual)<br>(450-500 words, single-spaced)   | 25%   |
| 9. Class participation  | 6%    |
| (A=6%; B=4%; C=2%; D=0%)  |       |
| 10. Attendance (2% off for each missed day after the first three).<br>(example: if you miss 8 days, attendance grade is -10%) |       |

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Total	100%
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\*includes 4% for presentation and 4% for peer evaluation.

**Due dates**

If you miss a class session, you are responsible for homework, class assignments, etc. Class participation grade may include class discussion, written work assigned in class, and other in-class activities.

All written reports are due in class on dates scheduled. Case analyses are due in class or due in my office before class on the date scheduled. Late submissions of case analyses will not be graded. Late reports will be marked 10% off per day.

## SUGGESTED QUESTIONS FOR THE CASES

The following questions do not exhaust all possible questions relating to a case. However, these questions should help you get a good start on analyzing the cases. Feel free to pursue questions and issues not included in the questions below.

### **Nylon Recycling Technology Commercialization**

1. Is this a project worthy of commercialization? Why?
2. What would be the best commercial arrangement to maximize revenue for the university and inventor?
3. Your recommendation, and justify it.

### **BMW AG: The digital car project (A)**

- 1) “Developing a new product with a new process is dangerous,” says Mr. Rathgeber—comment.
- 2) What are the key differences in Exhibits 6, 7 and 8?
- 3) What do you learn about “engineering lead time” reduction through the BMW case.
- 4) Should BMW apply the digital approach to development to the 7-series or the 3-series touring sedan?

### **Plus Development Corporation (A)**

1. What is different about the way JEMCO, the Japanese partner, approaches product and process development and the way development has been approached at Quantum? What accounts for these differences?
2. How important is it to stay on schedule in such a product development effort? Why?
3. How far behind to you think the development effort is? What should Plus do about it? (Develop a plan of action for the next several months.)
4. Long-term, what does Plus bring to the development effort and the business? Does the partnership provide a foundation for a viable long-term competitive position?

### **Quantum Corporation - Business and Product Teams:**

1. What is required to be successful in the Winchester disk drive industry? What do you think accounts for Quantum's success?
2. What is your evaluation of Quantum's progress to-date in developing and applying team concepts?
3. How effective have the major teams been? What accounts for their primary differences in effectiveness?
4. How would you recommend that Dave Brown address the team-related issues raised at the end of the case? Why? Are there other team issues that you would add as high priority on his list?

5. Develop an overall plan of action for addressing these issues. How should they be linked to other aspects of Quantum's management approach? How should they measure and track their progress in implementing that plan? (Be specific as to actions to be taken, their timing, and the results expected.)

### **Campbell Soup Company:**

1. Evaluate why this project is not getting completed on time. What would you recommend to Campbell to improve the timely completion of similar projects.
2. What is your analysis of the Plastigon project as of March 1988? What knowledge is needed to operate the Plastigon process successfully? As Elsner, what do you think of Gardner's assessment and proposal?
3. What actions would you recommend to Elsner regarding Engineering Systems' support of microwavable soups? How can Elsner's organization better support the corporate efforts in this area?
4. What are the major issues facing Elsner and his colleagues on the technical side of the house in using technology to provide a stronger market advantage? Where should Elsner focus his longer-term attention in building competitive advantage?

### **Spin Master Toys (A)**

1. What are the strategic issues involved in this case?
2. What are the risks facing this company? How serious are the risks?
3. Which of the two suppliers would you choose and why?

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### **Relevant Web Pages for the course: (if you run across a useful web site, e-mail it to me)**

#### **New Venture and Product Design**

New venture: <http://www.vcapital.com/Account/Account.htm>  
[http://www.nciia.org/resource\\_folder/entreguides/gettingstarted/](http://www.nciia.org/resource_folder/entreguides/gettingstarted/)  
<http://www.nciia.org/>

Design management: <http://www.designmgt.org/dmi/html/index.htm>

#### **Other links on Process Innovation**

List of links: <http://www.manufacturingnews.com/links.html>  
<http://www.industryweek.com/products/bestplants/>  
[www.wbs.warwick.ac.uk/omindex/annex/whatis.html](http://www.wbs.warwick.ac.uk/omindex/annex/whatis.html)  
[www.anbar.co.uk/courseware/mba/op-index.htm](http://www.anbar.co.uk/courseware/mba/op-index.htm)

ISO 9000, etc.: <http://www.isogroup.simplenet.com/>  
<http://www.ceem.com/>

Quality:

[http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.deltagr.com/case\\_studies.htm](http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.deltagr.com/case_studies.htm)

Manufacturing Engineering: <http://www.uwstout.edu/mevl/>

Industrial Engineering: <http://www.isye.gatech.edu/www-ie/publications/>

*Quality Digest* magazine: <http://www.qualitydigest.com/>

*Quality Online* magazine: <http://www.qualitymag.com/>

Manufacturing links: [http://www.nttc.edu/manufact/man\\_links.html](http://www.nttc.edu/manufact/man_links.html)

NIST Manufacturing Extension Partnership: <http://www.mep.nist.gov/>

JIT: <http://abcnews.go.com/sections/business/DailyNews/justintime980616/>

Publishers: <http://us.f9.mail.yahoo.com/ym/login?.rand=6cc7q1q1q1c3q>

*Manufacturing Center*, net magazine: <http://www.ManufacturingCenter.com/>

*Quality in Manufacturing*: <http://www.qualityinmfg.com/links.asp#assoc>

Cell manufacturing:

<http://www.baysidemotion.com/Web/BMGWebDocs.nsf/f2a86db96fc5172585256644004b88f2/ba892d81a32f75b78525664400519d10?OpenDocument>

National Quality program at NIST--Baldrige Program: <http://www.quality.nist.gov/>

Library on Quality: <http://www.quality.nist.gov/lib.htm>

Operations management: <http://www.mhhe.com/business/opsci/pom/>

<http://www.anbar.co.uk/coolsites/management/op/index1.html#7>

Global factory case study: <http://www.globalfactory.net/case.html>

Supply chain: <http://www.supply-chain.org/>

End.