

Strategy and Technology have no
business being in the same
title.... Or do they?

Part II

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2/16/2021

*Answer: It depends.

Who am I ?



- Boeing
 - President Germany & N. Europe
 - VP European Tech Strategy
 - VP & GM – Boeing Research and Technology
 - President – Phantom Works
- HRL (former Hughes Research Lab)
 - President and CEO
- Northrop Grumman Integrated Systems
 - Sector VP – Technology and Strategy
- Navigator Technology Ventures
 - Managing Director
- Draper Laboratory
 - VP Programs and VP Technology
- DARPA
 - Director, Sensor Technology office
- MIT Lincoln Lab
 - Assoc Group Leader
- Johns Hopkins University – Applied Physics Lab
- THE Ohio State University – PhD Elec Eng
- Several AF and DoD Advisory Committees



Topics for Today

- Review of Part 1
- Innovation and Value Creation
- R&D Planning/Roadmapping (and related career planning)
 - Cultural Issues
- Lessons learned

Options for the Graduating Engineer

- Academia
- Industry
- R&D Lab
- Start-up Company

Innovation and Value Creation

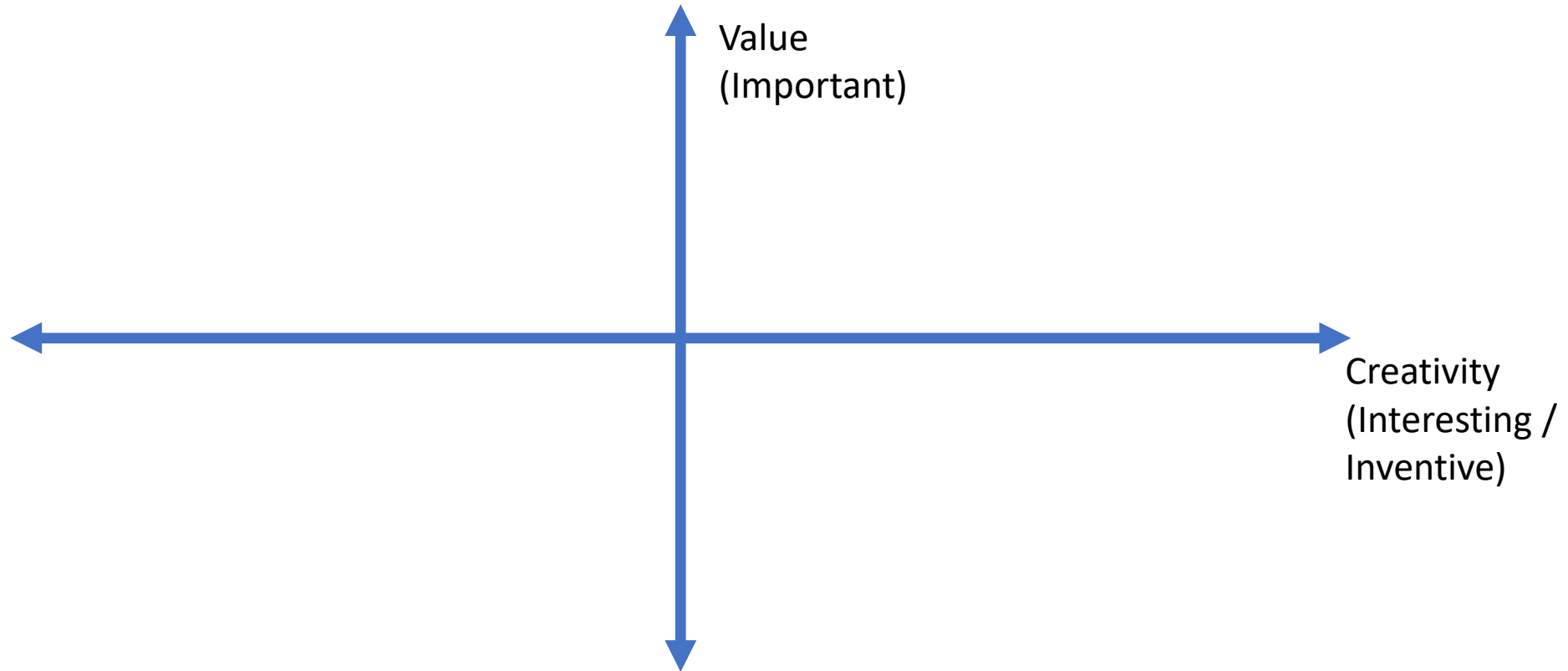
- Interesting vs. Important
- Inventive vs. Innovative

Innovation and Value Creation

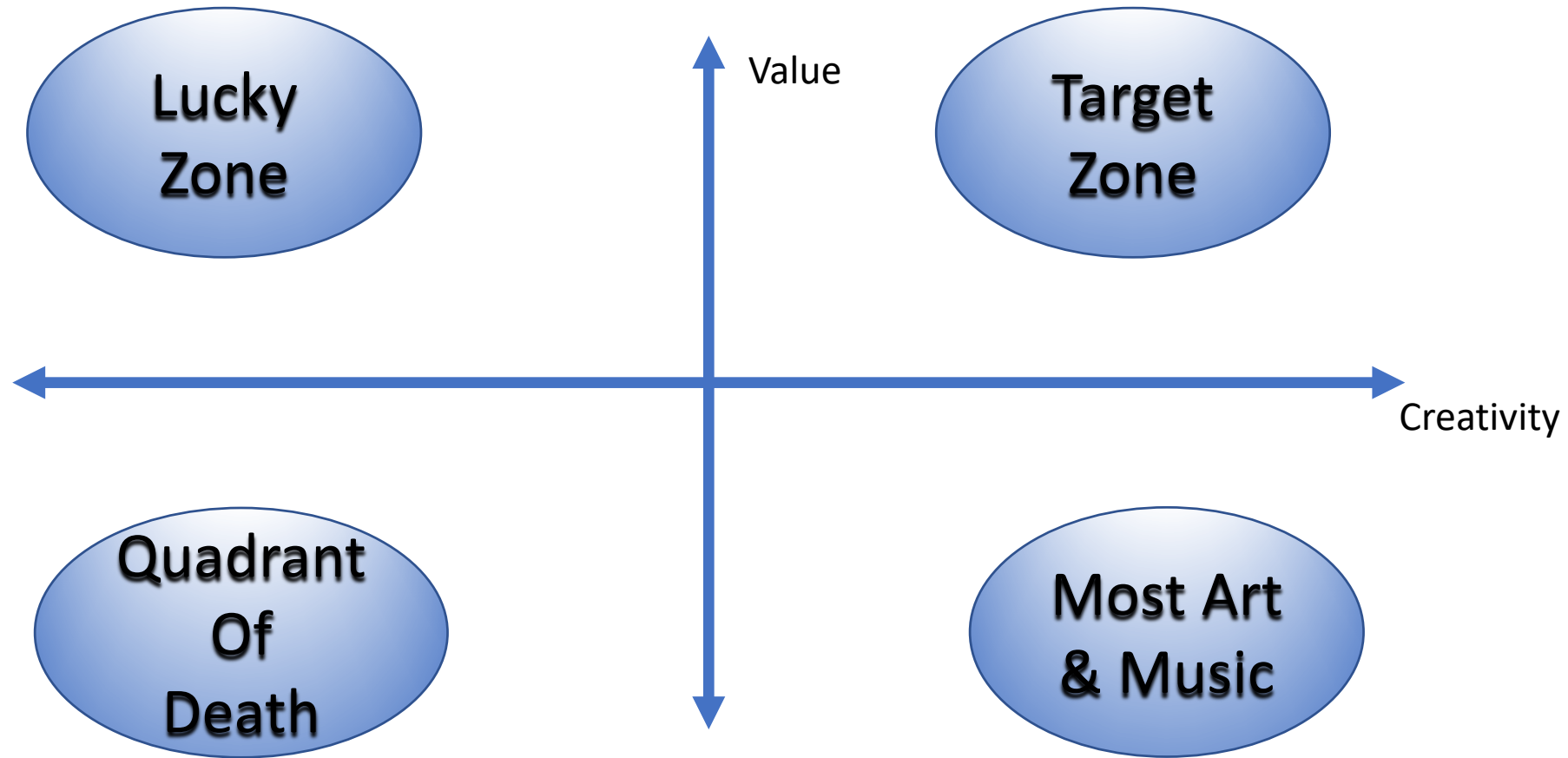
- Interesting vs. Important
- Inventive vs. Innovative

Steve Jobs: “If your cool idea doesn’t generate enough cash to cover the cost of development plus a profit, it isn’t innovation, it’s art”

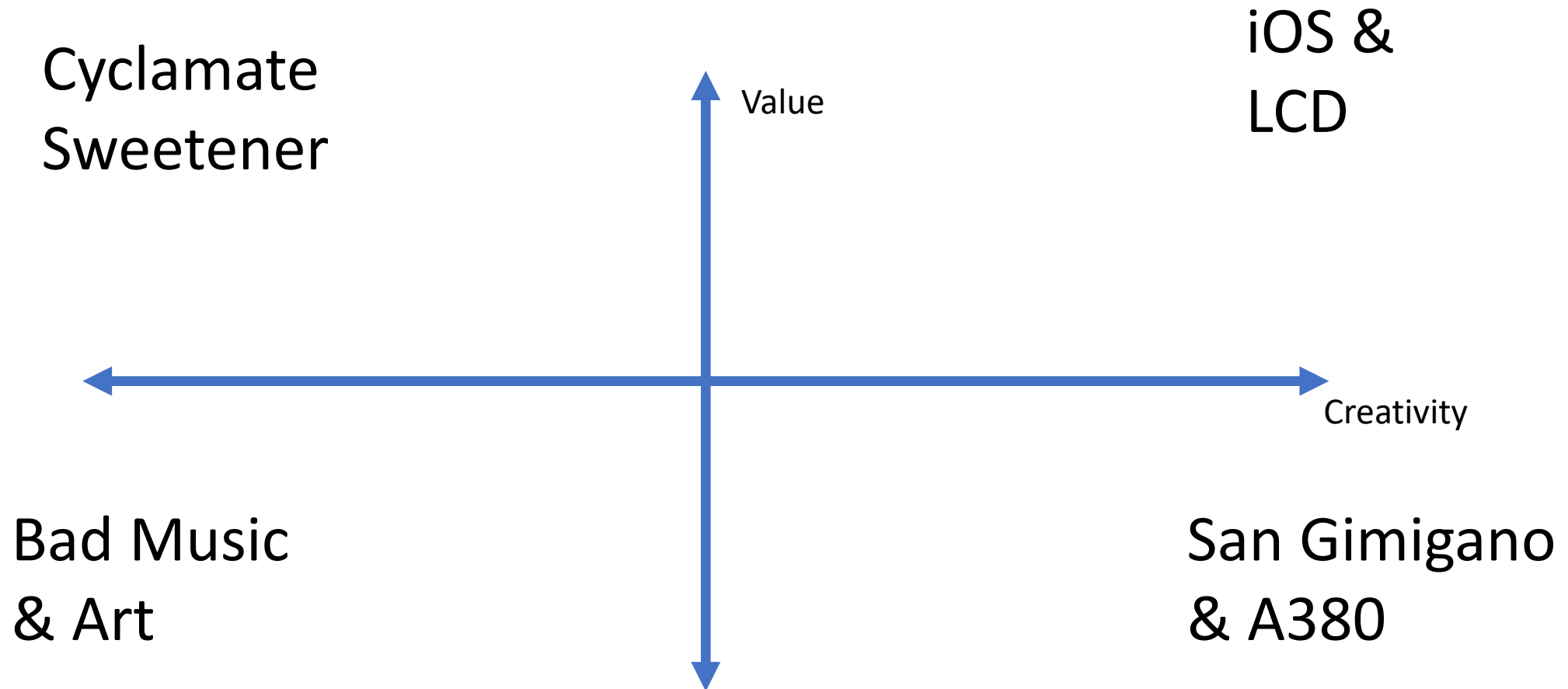
Quadrants of Innovation



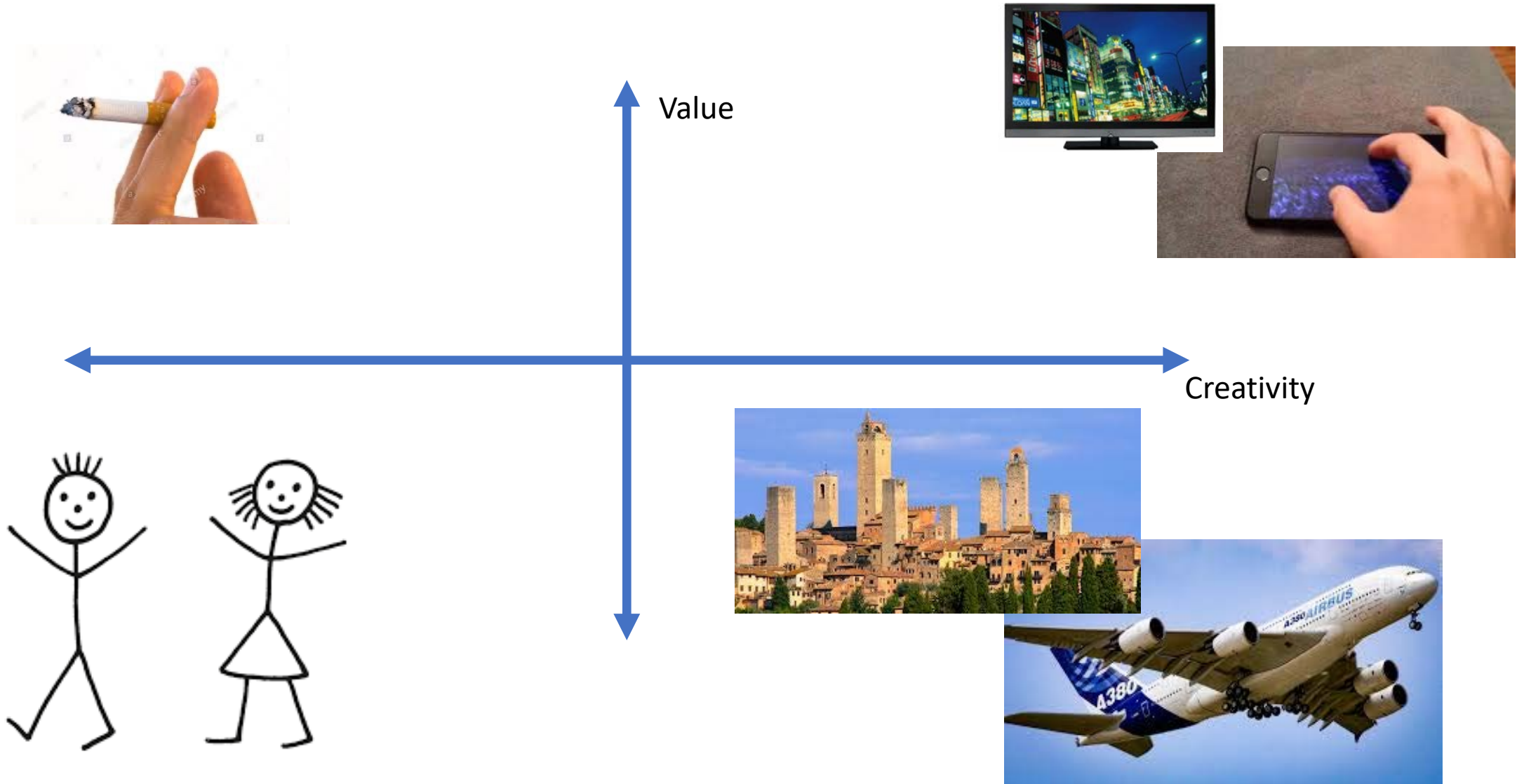
Quadrants of Innovation



Quadrants of Innovation



Quadrants of Innovation



Is a process-driven environment/culture compatible with innovation?

- Absolutely:
 - Rules provide Structure:
 - Provide for an efficient environment for comparison
 - Provide for an efficient environment for teamwork
 - (And discourage anarchy / destructive behavior)
 - Allow for resource allocation and scheduling

Why do I need to think about R&D Management if I'm not a manager?

- To be the best in class when resource decisions are made
- To prevent wasting time (your most precious career resource)
- To reduce the personal stress associated with complexity and the unknown
- To manage yourself when your own manager may be weaker, but more senior, than you.
- To practice for being a manager someday

Top Level R&D Planning

- Think about both quantitative goals and institutional culture
- Bucket research by institutional goals first. Then run competition for resources project by project.
- Resource allocation bucketing example. HRL Internal R&D planning:
 - Anti-Gravity
 - Attract government R&D funding
 - Keep owners or other stakeholders happy
 - Keep tools and facilities modern (grinding wafers)

Peter Drucker: “Culture eats strategy for breakfast.”

R&D (and life) Planning and Roadmapping



- George Heilmeier:
 - Inventor of Liquid Crystal Display (LCD)
 - Director of DARPA
 - Mentor extraordinaire

The Heilmeier Questions

- What are you trying to do? What is the problem/benefit and why is it hard
- How is it done today, and what are the limits of current practice?
- Who cares? Who benefits if you are successful?
- What are your major milestones and schedule and what resources do you need?
- How are you linked to other activities? (i.e., other projects/technologies?, ability to attract funding/talent, etc.)?
- What is your intellectual property strategy?
- What help do you need?

Random Parting Advice

- Your personal integrity/ethics above all, be vigilant and protect it!
- Work for a good boss!
 - Your job is to do his/her job (at least your part of it)
 - Change jobs if you've got a bad boss
- Seek challenges and feedback
- Understand the business that you are in.
 - Businesses (even universities) are driven by \$\$\$\$.
 - Understand your company's value proposition and your value to the company
- Watch your peers. Help them be successful. Don't steal credit. Your contributions will be obvious.
- Don't be afraid to move around!!
 - Breadth is as important as depth
- Make career decisions with the aid of a spreadsheet
 - Map the criteria and importance with the computer
 - Decide with your gut

Don't Forget to Have Fun!

Good Technology + Good Business = FUN!

"Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. If you haven't found it yet, keep looking. Don't settle. As with all matters of the heart, you'll know when you find it." – Steve Jobs