INTERNATIONAL PROJECT MANAGEMENT (IPM)

Session 2
Key Concepts, Planning, Process and Techniques

EFREI Winter – 2017 – Michael Otten, Professor

Course Culture

- **Politesse**
  - **Respect for others – quiet when others talking**
  - **Phones and computers off and away, except when presenting**
  - **Be at class promptly at start and after breaks**
- **Taking Roll**
  - **At start of class and after break**
  - **Please explain any absences, preferably in advance**
    - **Document reasons to m.otten@ieee.org**

Some Conventions (Standards)

- Use meaningful file names
  - IPM [owner of file] 2016-XX-XX [subject of file]
    - Example: IPM B 2016-01-25 Homework
- Always spell out terms before abbreviating
  - Example: Enterprise Resource Planning (ERP)
- Ensure that you track progress against original plan estimates for cost and dates, even if you revise plan for good reasons
  - You can also reference a revised plan, but don't lose sight of your initial assumptions for value/cost

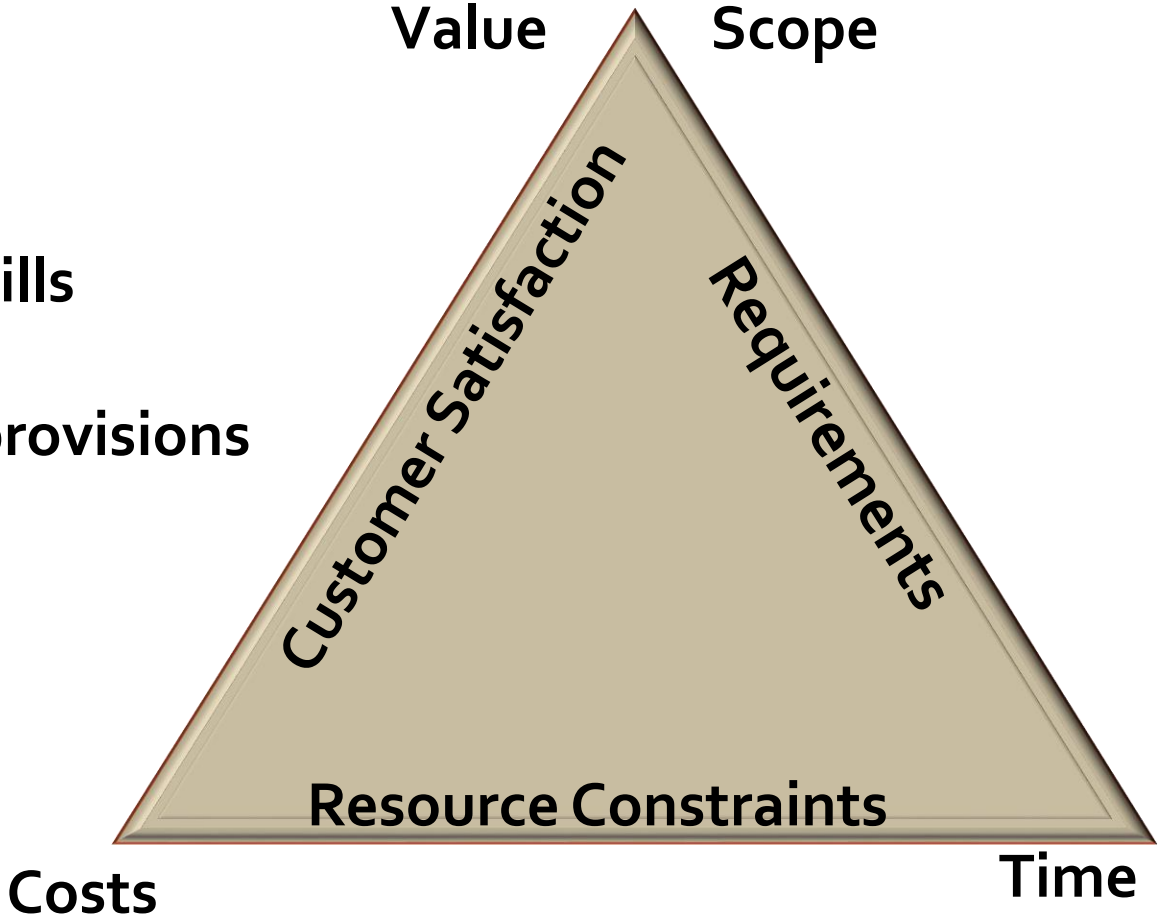
Homework due Noon, Today
Initial Project Planning

- Charter - LATIN AMERICA (LA) PROGRAM
  - **1-2 Sentences Statement of Program/Project Mission**
- Major Work Elements or Tasks to be Performed
  - Assign Tasks to Team Members
- Stakeholders Identified
  - Project Owner, usually same as Project Funder
  - Beneficiaries or Customers
  - Performers – roles by activity
- Constraints
  - Timeframe
  - Cost
  - Resources/Skills

Key Concepts

Constraints

- Budget
- Resources/Skills
- Schedule
- Contractual provisions



BALANCE FACTORS

Key Concept - Failure

- Project Failure
  - Why do Projects & Programs Fail?
  - How often do Projects Fail?
  - How often and how long do projects continue after failure?

Key Concept - Failure

http://blog.projectconnections.com/project_practitioners/2009/04/why-bad-projects-are-so-hard-to-kill.html

- Especially "…*belief in the inevitability of the project's success*"

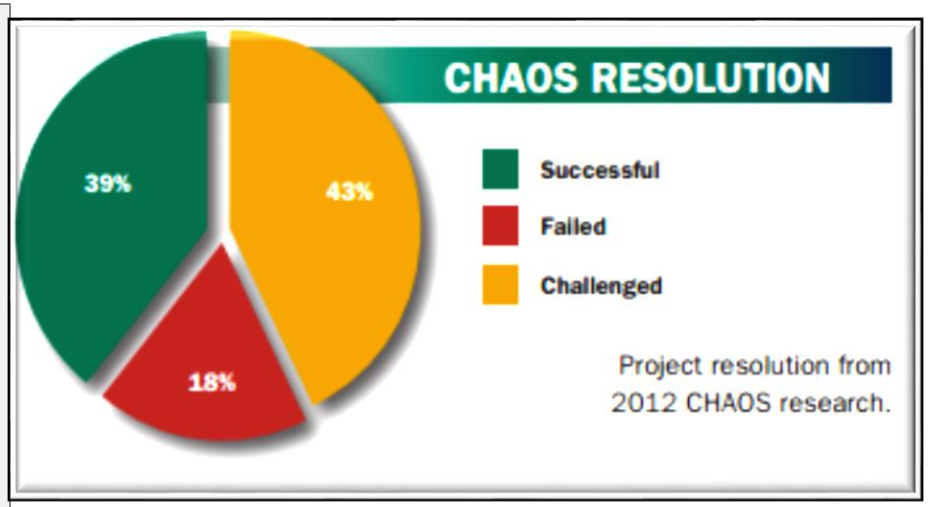
Key Concept – Success Questions

- How do you recognize projects have failed?
  - Will the Output of the project ever be used?
  - Is the value of the project output sufficiently large to warrant replacement of the status quo?

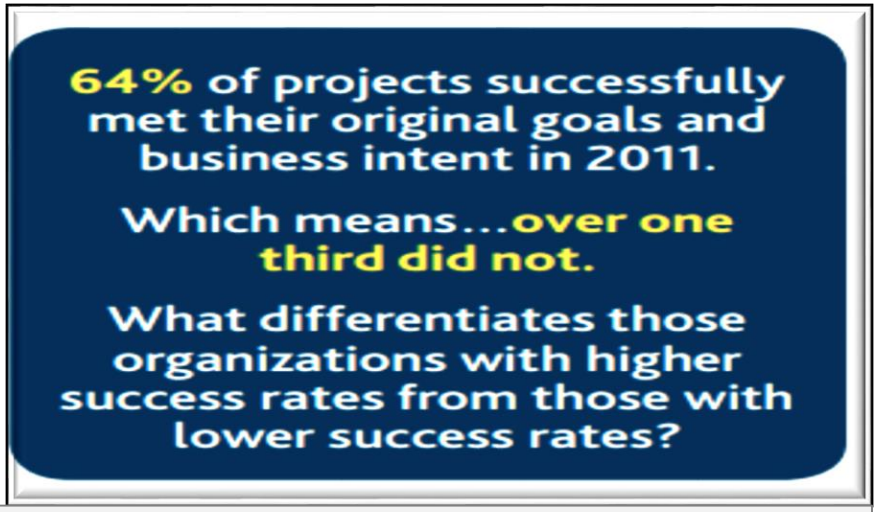
Key Concept - Failure

Reasons Why IT Projects Fail

- In **2012, a study led by the *Standish Group*** (source: http://versionone.com/assets/img/files/ChaosManifesto2013.pdf) reveals that:
  - 18% of projects are stopped before the end.
  - 43% of projects do not entirely correspond to the initial Statement of Work and are delivered late or out of defined budget (by 189% on average!)
  - 39% of projects are delivered within initial budget & leadtimes.



Another View of Project Success Rate:



Source: PMI
http://www.pmi.org/~/media/PDF/Research/2012_Pulse_of_the_profession.ashx

Reasons Why IT Projects Fail

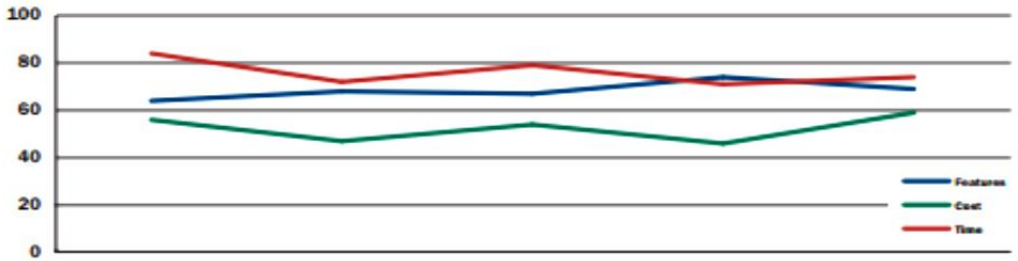
RESOLUTION

	2004	2006	2008	2010	2012
Successful	29%	35%	32%	37%	39%
Failed	18%	19%	24%	21%	18%
Challenged	53%	46%	44%	42%	43%

Project resolution results from CHAOS research for years 2004 to 2012.

OVERRUNS AND FEATURES

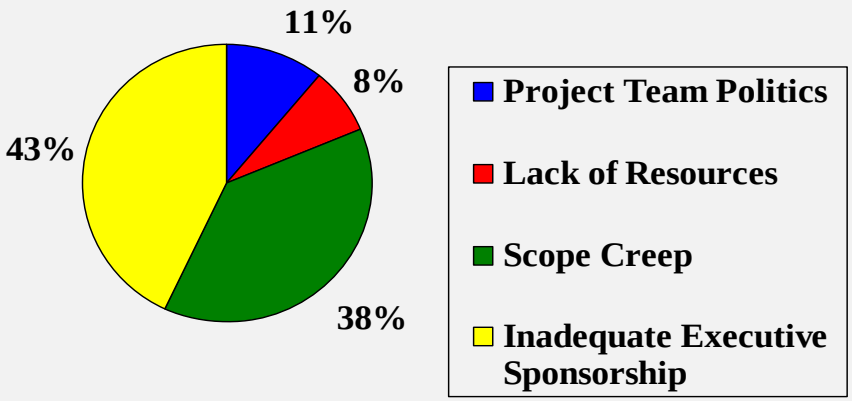
Time and cost overruns, plus percentage of features delivered from CHAOS research for the years 2004 to 2012.



	2004	2006	2008	2010	2012
TIME	84%	72%	79%	71%	74%
COST	56%	47%	54%	46%	59%
FEATURES	64%	68%	67%	74%	69%

Main Reasons Projects Fail?

- Changing scope
- Insufficient planning
- No risk or issues management
- Poor communication
- Lack of commitment and responsibility by stakeholders



Source: PM Network, May 2004, p.12

Key Factors for Project Success

- Understanding of project Charter and outcome Expectations
  - Congruence of Goals for various constituencies and stakeholders
- Key Executives Buy-In, especially at the Top (CEO)
- No Surprises – Change Management discipline
- WBS (Work Beakdown Structure) – Tasks well defined
- Individual activities not too big or too small
  - Individual tasks not too complex
- Positive Team culture
- Communications to all constituencies/stakeholders

Key Concepts - Success

Project Plan Management – Overview

Project Management (PM) - Planning and Implementation

- **Project Planning**
  - **PM Knowledge Areas**
  - **Prioritization**
  - **Latin America ERP Program as basis for Team Report**
- **Risk Identification, Evaluation and Management**
  - **Mitigation and Contingency Plans**
- **Plan Change Management**
  - **Triggers for Plan Change**
  - **Communication and Buy-in for Changes**

Project Management (PM) Knowledge Areas

1. **Integration Management**
2. **Scope Management**
3. **Cost Management**
4. **Human Resource Management**
5. **Time Management**
6. **Project Procurement Management**
7. **Risk Management**
8. **Quality (Satisfaction) Management**
9. **Communications Management**

http://www.projectsmart.co.uk/pmbok.html

PMBOK Guide 4th Edition Appendix F

1. Project Integration Management

- Develop Charter
- Develop Management Plan
  - Team Roles - Organization is part of this
- Execute Plan
- Monitor and Control
- Perform Integrated Change Control
- Close Project or Phase Definitively

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Business Need => Project Charter

- **Scope**
  - **Statement of Problem or Challenge**
  - **Boundaries of Solution, Deliverables**
  - **Time and Resource Feasibility**
  - **Critical versus Discretionary Project Elements**
    - **Prioritization**

- **Document Expectations**
  - **Project Objectives, Limitations and Time-Line**
  - **Stakeholders**
  - **Success Criteria**
  - **Business Case: Value versus Resources/Cost**
    - **Evaluation**

Green Chimneys Institute (GCI) Example

Green Chimneys Special Education School

- Nature Based Learning Unique Implementation
- Need to validate Nature Based Therapy
- Objectives of an Institute
  - Educate – Execute concept effectively
  - Communicate/Advocate – Ensure appreciation of results
  - **Research – Scientific Evidence Based Outcomes**

http://www.greenchimneys.org/theinstitute/

Example Project Charter

Title: "Template for Research Projects"

Project Charter: To Develop a Template for Research Projects that builds on the Nature Based Learning Model at Green Chimneys. The resulting template will facilitate design and implementation of research projects using Green Chimneys as the Field Laboratory. The Template will provide for Resource identification and commitment, description of hypotheses being tested, methodology for the research, format to report the results and a time-line for accomplishment of identified phases of the project.

Objectives - Build Research Design Guidelines, Provide for Stakeholder Commitments, Format Resource Commitments, Define Research Activities and Report Requirements.

Stakeholders – Institute Director, Green Chimneys Institute Staff, Green Chimneys Executive Steering Committee, Research Certification Committee, University Administration and Faculty Members, Researchers, Green Chimneys teachers and students, The Board and specific animals.

Example Project Charter – Success Factors

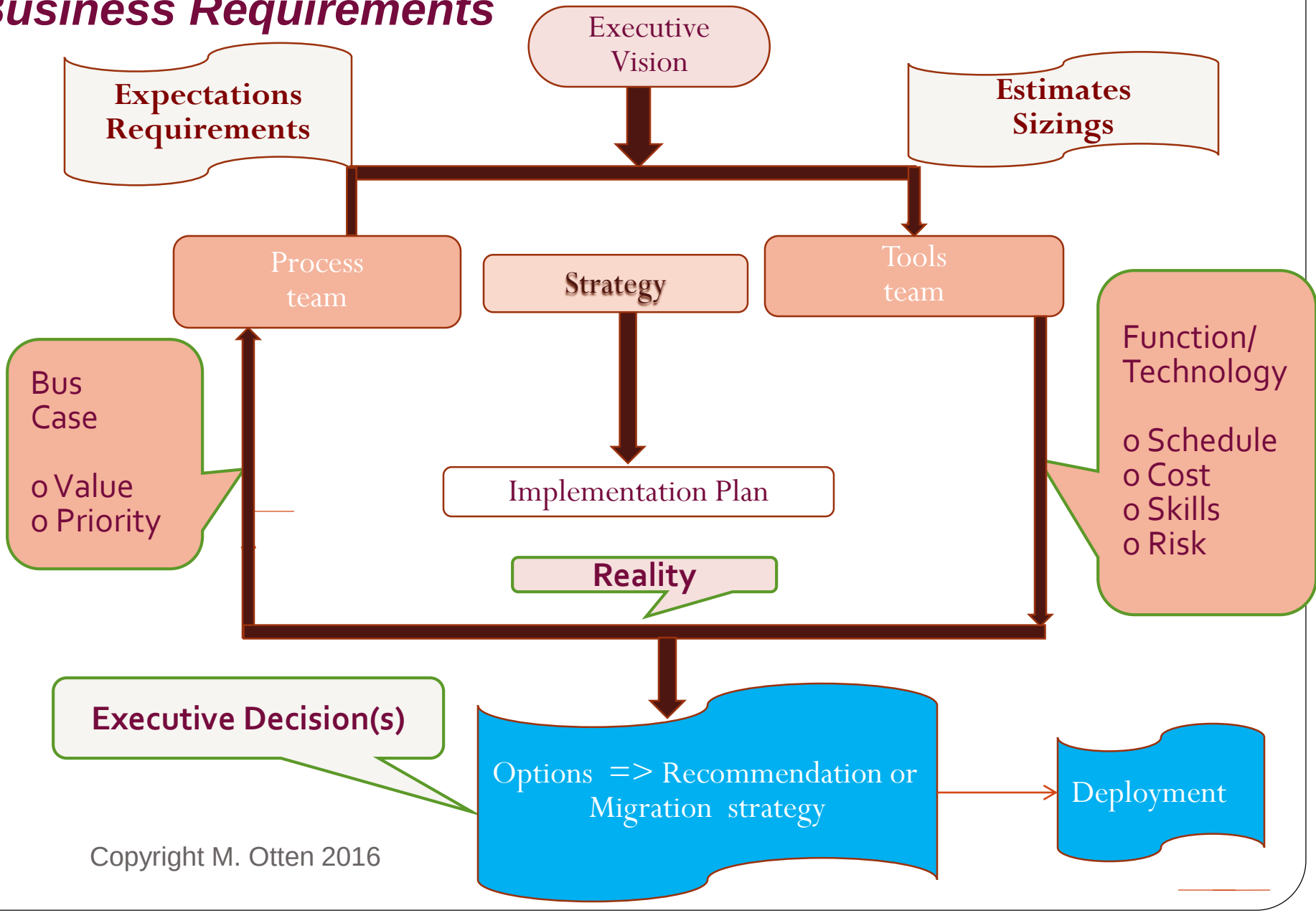
Success Factors:

o Researchers accept and use Template

- Objective: 4 research projects use within first year
- Objective: Not more than 20% of researchers request to make substantial changes in the template.
- Objective: Major Stakeholders accept template
    - 3/4 Universities (Denver, Yale, Tufts and Columbia)
    - GC Farm Director and management staff
    - GC School Principal
    - GC Clinical Director and Research Interns
- Objective: First Year reports utilize template and provide necessary information associated with publication in research journal(s).

Process Management Flow

Business Requirements



Project Prioritization Exercise

- Savoir came to HAL with serious inter-company business process problems
  - Decision made at President/Vice-President Level
    - Need to define discrete number of improvement projects
    - Need to prioritize action on a sub-set of projects
  - Prioritization task to Savoir VPs and HAL Consultant
    - Develop actionable projects
    - Prioritize Top 10 based on Return on Investment

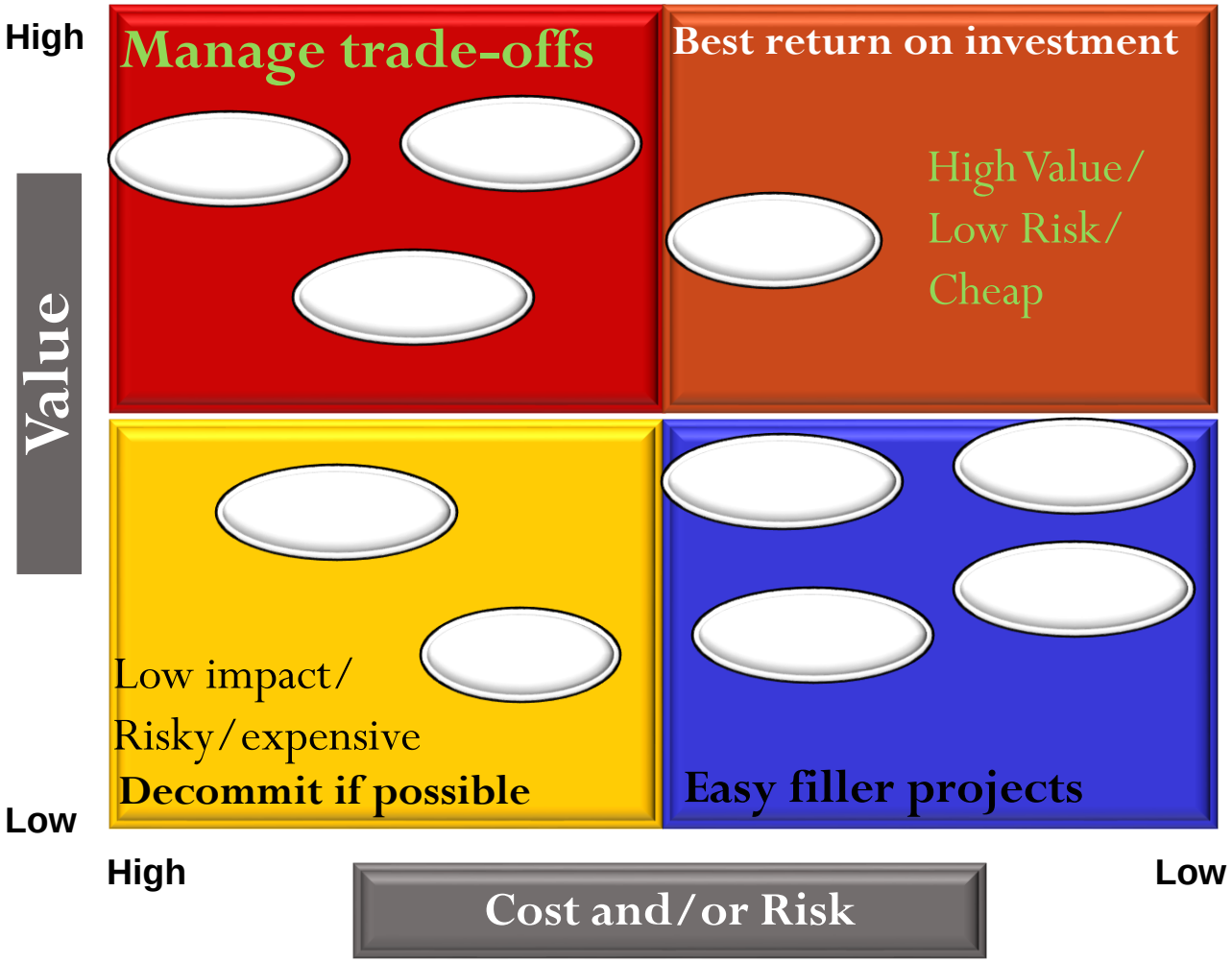
- Exercise: 10 Projects Prioritization
  - Discuss Charter for each Project
  - Understand Project Scope/Value, Cost/Skills, Timing
  - Prioritize 10 projects in Value/Cost-Risk Table

Savoir/HAL -- 10 Projects to Prioritize

1. Reduce/Improve Order to Delivery Time
2. Increase Number of Allowable No Charge Returns
3. Honor Configurator Output for 30 days
4. Provide Hot Line Exception Management
5. Maintain Reliable Contacts List
6. Increase Product Reliability
7. Implement Encryption Key SW Delivery
8. Reduce Reporting Complexity
9. Establish Dispute Escalation Process
10. Increase Graduated Sales Commissions

Project Priorities Evaluation

Value/Cost-Risk Table Template

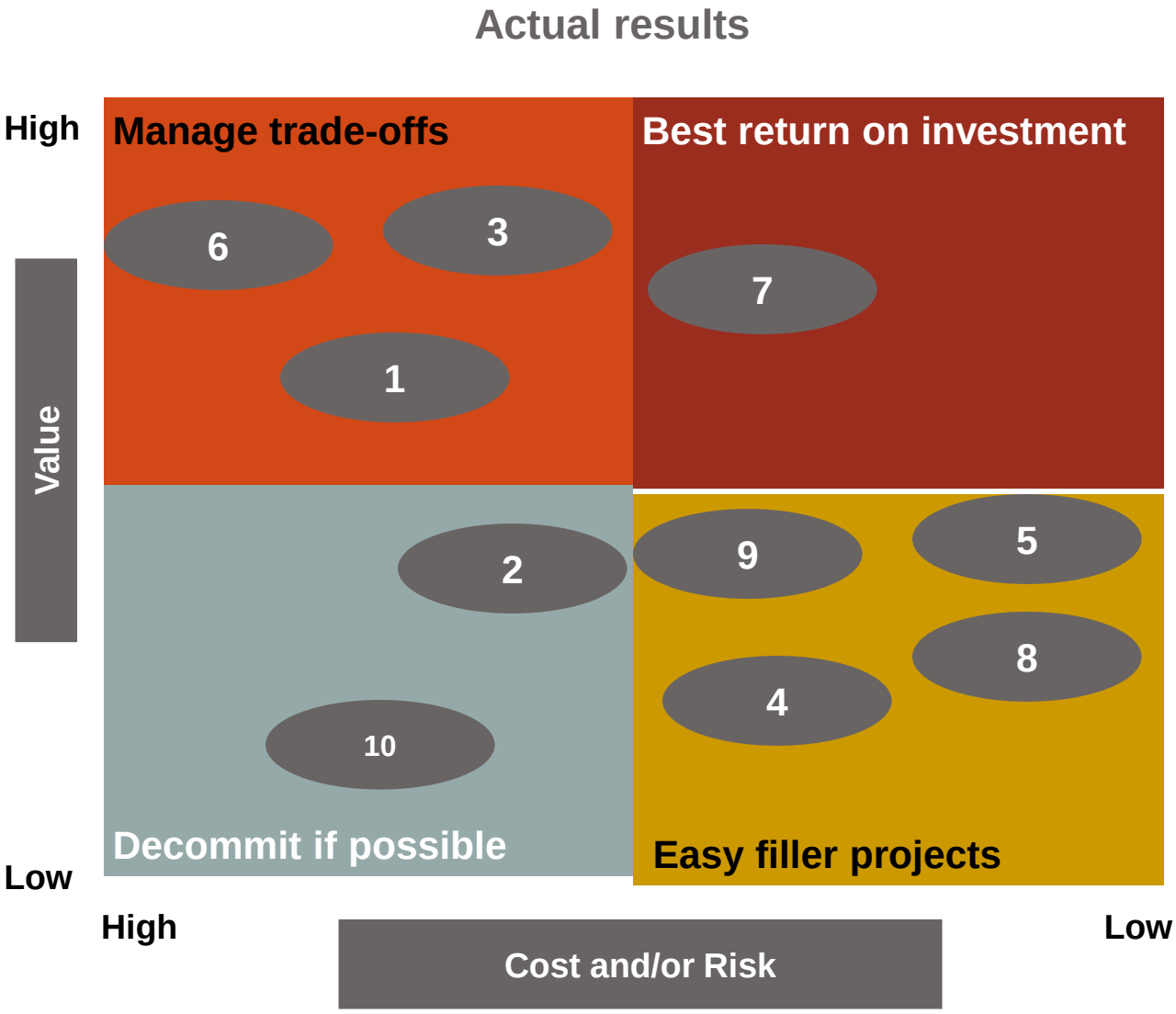


15 Minutes Exercise
Hand in your Prioritization

Restart Class by 15:40

Project Priority Assignment

1. Reduce delivery time
2. Increase number of allowable returns
3. Honor Configurator output for 30 days
4. Provide hot line exception management
5. Maintain reliable contacts list
6. Increase product reliability
7. Implement encryption key SW delivery
8. Reduce reporting complexity
9. Establish dispute escalation process
10. Increase graduated commissions



2016

Project Financial Evaluation

- 3 main methods
  - Payback
    - Simplest
  - Net Present Value (NPV)
    - Best Analytic
  - Internal Rate of Return (IRR)
    - Ties easily to investment economy

Payback Method

- The length of time taken to repay the initial capital cost
  - Requires information on the returns the investment generates
    - e.g. A machine costs $600,000
    - It produces items that generate a profit of $5 each on a production run of 60,000 units per year
    - Payback period will be 2 years

5 x 60,000 units = $300,000 per year profit

Therefore, 2 Years to cover $600,000 investment

Simplest Methodology, but neglects Time:Value Relationship

Time Value of Money: Net Present Value (NPV) Concept

- Project A costs $1,000,000
  - Cash return $250,000 in 5 years (25%)

- If you had invested the $1 million into a bank offering **compounded interest** at 5%/year the return would be greater = ~$276,000

  Why not 5x50,000 = $250,000 ?

- You might be better off re-considering your investment, even without considering risk.

Investment Appraisal

$100 now or

$100 in 5 years

Which is worth more?

- To make an informed decision, more sophisticated techniques need to be used.
- Importance of **time-value of money**

Net Present Value

$$\mathrm{NPV}(i, N) = \sum_{t=0}^{N} \frac{R_t}{(1+i)^t}$$

Each cash inflow/outflow is discounted back to its present value (PV). Then they are summed. Therefore NPV is the sum of all terms, where

t– the time of the cash flow

i– the discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.); the opportunity cost of capital

Rt– the net cash flow i.e. cash inflow – cash outflow, at time *t*.

NET PRESENT VALUE

If...	It means...	Then...
NPV > 0	The investment would add value to the firm	The project may be accepted
NPV < 0	The investment would subtract value from the firm	The project should be rejected, unless there are other over-riding factors
NPV = 0	The investment would neither gain nor lose value for the firm	We should be indifferent in the decision whether to accept or reject the project. This project adds no monetary value. Decision should be based on other criteria, e.g., strategic positioning, risk or other factors not explicitly included in the calculation.

NET PRESENT VALUE - EXAMPLE

Invest $2,000 now, receive 3 yearly payments of $100 each, plus $2,500 in the 3rd year. Assume 10% alternative investment Interest Rate.

Year by year (remembering to subtract what you pay out):

- Now: PV = **-$2,000**
- Year 1: PV = $100 / 1.10 = **$90.91**
- Year 2: PV = $100 / 1.10^2 = **$82.64**
- Year 3: PV = $100 / 1.10^3 = **$75.13**
- Year 3 (final payment): PV = $2,500 / 1.10^3 = **$1,878.29**

Adding those up gets: **NPV** = -2,000 + 90.91 + 82.64 + 75.13 + 1,878.29 = + **$126.97**

Looks like a reasonable investment, depending on risks.

INTERNAL RATE OF RETURN

- The IRR is the rate of interest (or discount rate) that makes the net present value = to zero
  - Helps measure the worth of an investment
  - Allows the firm to assess whether an investment in the machine, etc. would yield a better return based on internal standards of return, or external interest rate environment
  - Allows comparison of projects with different initial outlays
  - Set the cash flows to different discount rates
  - Software or simple graphing allows the IRR to be found
  - NPV as net of 1/(1+IRR)exp years) of cash flow (positive and negative) from investment equals zero

Quick Quiz

- Consider an investment that costs $100,000 and has a cash inflow of $25,000 every year for 5 years.
- Alternative is to invest in a Bond with a 5% interest rate.
  - What is the payback period?
  - What is the NPV?
  - Should we accept the project, assuming no risk?

(Individual Exercise – 15 minutes)

Valuation Quiz Results

- Payback Period = 4 years (100,000/25,000)
- Net Present Value
  - -100,000
  - +25,000/1.0500=23,810
  - +25,000/1.1025=22,676
  - +25,000/1.1576=21,596
  - +25,000/1.2155=20,568
  - +25,000/1.2763=19,588
  - NPV = +$8,238

- Internal Rate of Return IRR = 7.93% break-even in 5 years
  25,000/1.07931, etc.
  (Better at bank if 8% Interest)

- Yes, assuming that Qualitative Risks are reasonable

15 Minutes Break

Return to Class at XX:XX

2. Project Scope Management

- Collect requirements
- Define scope
- Create Work Breakdown Structure = **WBS**
  - Tasks
- Verify scope
- Control scope

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Some Software Development Models

- Waterfall model
- V model: https://en.wikipedia.org/wiki/V-Model
- Incremental model
- RAD (Rapid Application Devlelopment) model
- Agile model
- Iterative model
- Spiral model

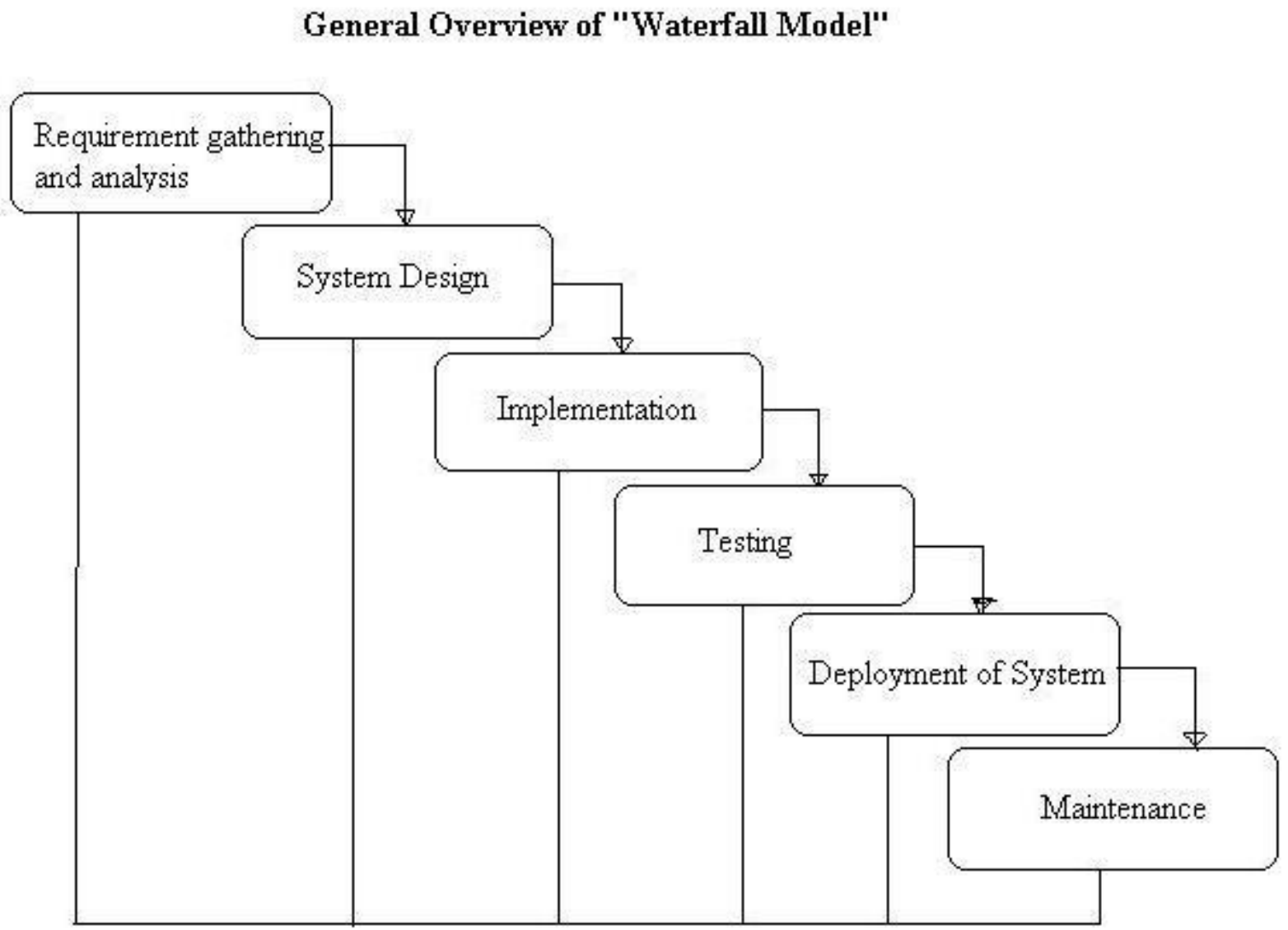
http://istqbexamcertification.com/what-are-the-software-development-models/

SW Development Process Examples

- **Waterfall Methodology**
  - Requirements and Design carefully fixed, but somewhat rigid
  - Whole Cycle completed before new Release designed
  - Whole development process completed with minimal changes
  - Works well if Requirements are stable and well understood

- **AGILE Methodology**
  - Small incremental enhancements in short overlapping release cycles
  - Works best with tight loop between Users & Developers
  - Adapts quickly to changing environment
  - Problem if insufficient testing
  - Problem if 'look and feel' of SW is changed too often

http://istqbexamcertification.com/what-is-agile-model-advantages-disadvantages-and-when-to-use-it/



http://istqbexamcertification.com/what-is-waterfall-model-advantages-disadvantages-and-when-to-use-it/

3. Cost Management

- Estimate Costs
- Determine Budget
- Control Costs

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Cost Management

- Estimate
  - Usually do at work unit level: Resource/time and Money
  - Avoid 'False Precision'
    - 37 Person Months, not 37.58 Person Months
  - Relate contingency to Risk

- Set Budget
  - Aggregate estimated costs, but avoid false precision
    - Use Confidence Levels and Probabilities to assess major items

- Monitor and Control
  - Define periodic control points
    - Fixed Time period (e.g., monthly) and/or Milestones
  - Assess variances and corrective actions, if needed
  - Establish criteria to trigger and invoke Plan Change Management

4. Human Resource Management

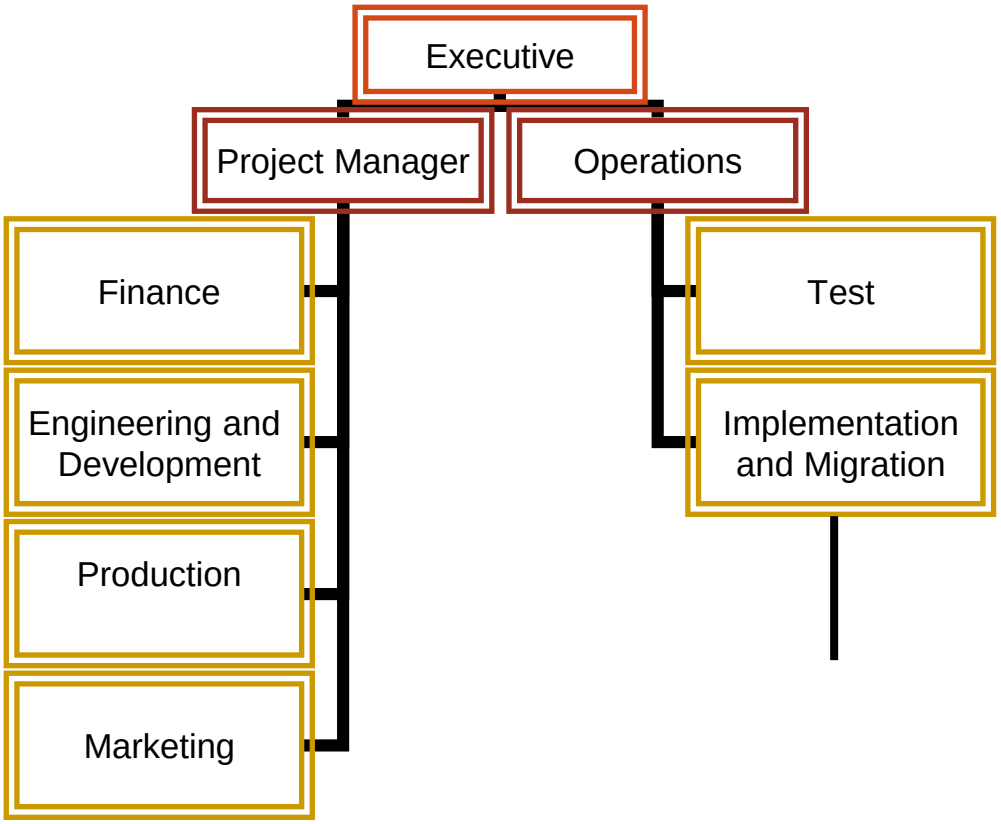
- Develop human resource plan
  - Roles, Responsibilities, Authorities, Organization
- Acquire project team – Evaluate skills strength
- Develop project team
  - Recognize skill variance from the 'ideal' plan
  - Provide for Training or Consultant support as needed
- Manage project team

PMBOK Guide 4th Edition Appendix F, Section 9.

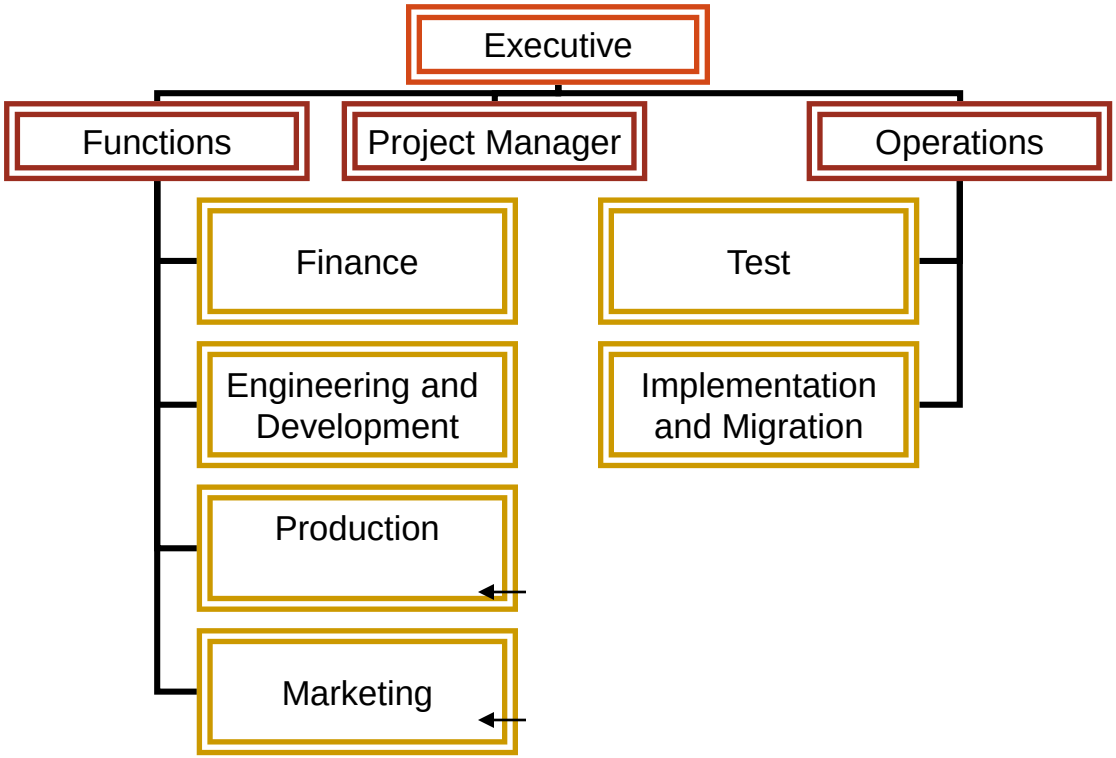
Organizational Structures

- Projectized Organization
- Functional Organization
  - Engineering & Development
  - Operations – Ordering and Distribution
  - Marketing & Sales
  - Finance
  - Services
    - **Human Resources**
    - **Legal**
    - **IT**
- Matrix Organization

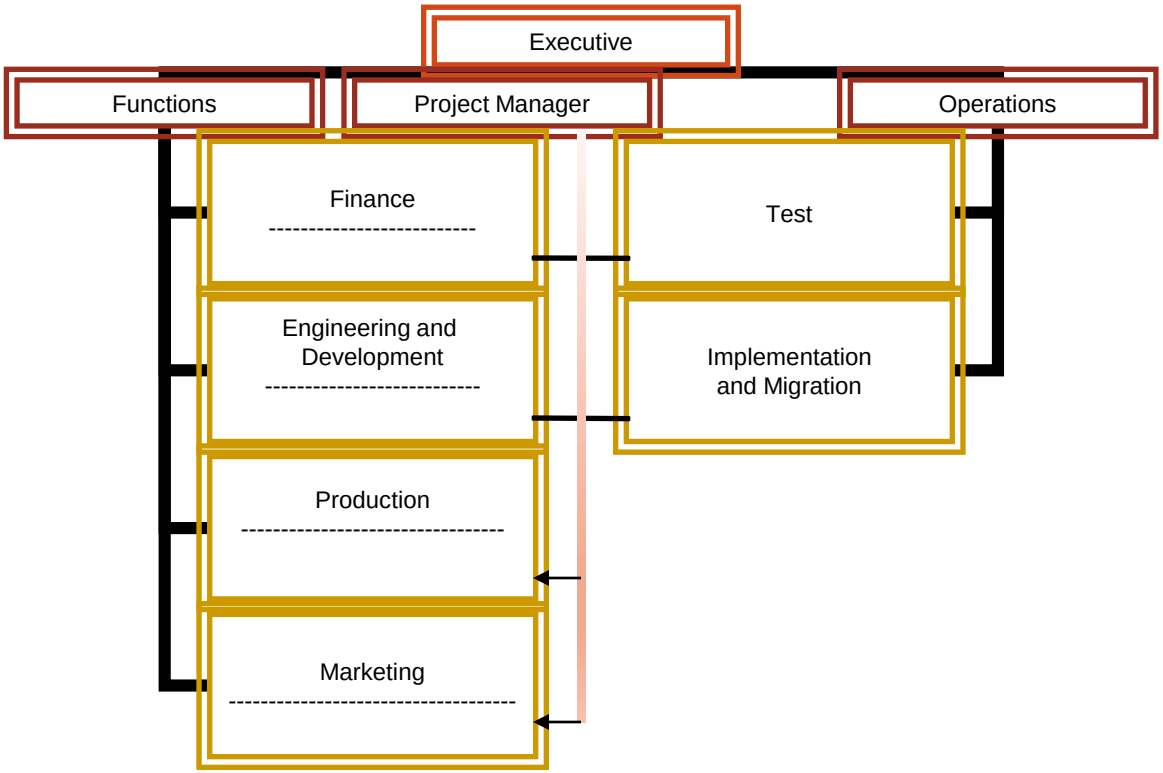
Projectized Organization



Functional Organization



Matrix Organization



ORGANIZATION STRUCTURE *

Structure vs Charac-teristics	Functional	Weak Matrix	Balanced Matrix	Strong Matrix	Projectized
Proj Mgr Authority	**Little or None**	**Limited**	**Low to Moderate**	**Moderate to High**	**High to Almost Total**
Resource Availability	**Little or None**	**Limited**	**Low to Moderate**	**Moderate to High**	**High to Almost Total**
Who controls Budget	**Functional Manager**	Functional Manager	Mixed	Project Manager	**Project Manager**
Proj Mgr Role	**Part-time**	**Part-time**	**Full-time**	**Full-time**	**Full-time**
Proj Mgmt Admin Staff	**Part-time**	**Part-time**	**Part-time**	**Full-time**	**Full-time**

* PMBOK Guide 4th Edition Section 2.4.2

5. Time Management

- Activity Development
  - Define activities
  - Sequence activities
  - Estimate activity resources
  - Estimate activity durations

- Map Time with Gantt /PERT methodologies
  - Develop schedule
  - Control schedule

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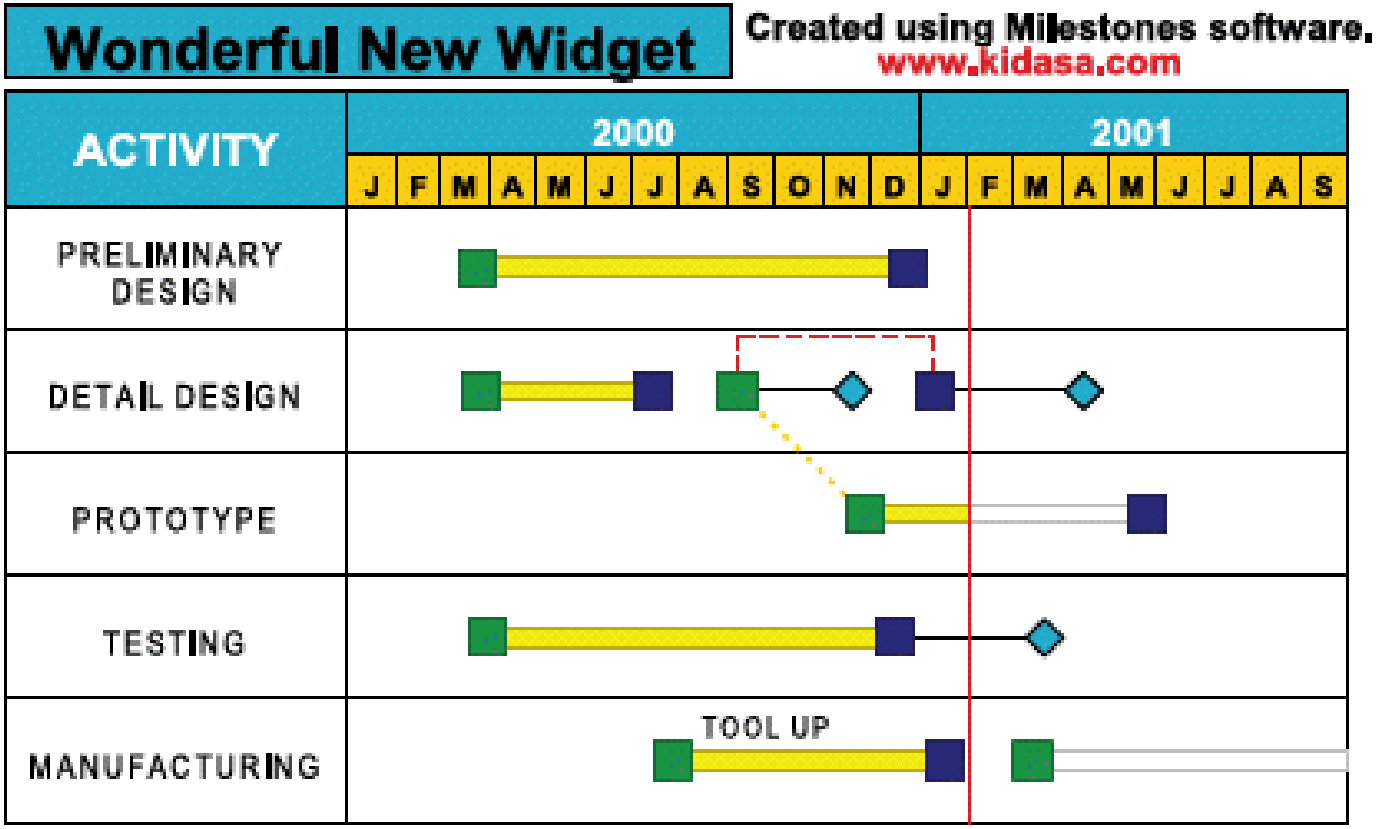
Management Plan & Tracking

Gantt Chart: http://www.ganttchart.com/



- See also, "Managing for Excellence," M Ali, et al, p 340.

Order to build a schedule when using scheduling tools

1. Setup Project Information (Calendar, Start date, etc).
2. Enter Deliverables & Activities *(Records WBS)*
3. Enter Estimates
4. Enter Predecessors
5. Enter Resource definitions (Calendar, working time, etc.)
6. Assign Resources to activities
7. Analyze the critical path
8. Make adjustments based on risk responses
9. Compress the schedule
10. Baseline the schedule

PERT Critical Path Analysis

- Program Evaluation and Review Technique (PERT)
  - http://www.mindtools.com/critpath.html

- Estimating Processes
  - Expert Judgment
  - Analogous Estimating uses experience from similar project for timing, budget, complexity, etc.
  - Parametric Estimating relates more general historical data to the key factors of a project
  - Three-Point Estimating takes a weighted average of Most Likely, Optimistic and Pessimistic estimates

Gantt and PERT Planning and Control

- Both PERT and Gantt charts display the tasks to be completed
- Gantt charts focus on the **percentage completion of each task**, without demonstrating the link that two tasks may have to each other.
- PERT typically does not show the percentage completed. Because it employs a network model, it is easier to see **which tasks depend on each other, and where contingencies may be necessary.**
- Both show project **milestones** that enable good control.

http://smallbusiness.chron.com/difference-between-gantt-charts-pert-charts-43848.html

6. Project Procurement Management

- Plan procurements
  - Ensure multiple bids
  - Avoid Conflict of Interest
- Conduct procurements
- Administer procurements
- Close procurements

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Project Management (PM) Knowledge Areas

1. **Integration Management**
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http://www.projectsmart.co.uk/pmbok.html

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9. Communications Management

- Identify stakeholders
- Plan communications
- Distribute information
- Manage stakeholder expectations
- Report performance

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Who are the stakeholders ?

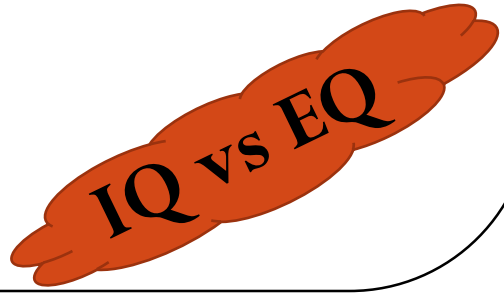
- Stakeholders are:
  - Sponsor/Owner/Funder
  - Project Managers
    - Teams
  - Customers
  - Performing Organizations
    - Teams
  - Internal/External
  - End User
  - Society
  - Others: Supplier, Contractor, Media

Communication Methods

- One on Ones
- Meetings
- Telephone
- Teleconference (Videoconference)
- E-mail/Net-meetings
- Management Reports
- Newletters
- Social Media
  - SMS/Messaging
  - Twitter
  - Facebook

A few points on communicating effectively

- Prepare your message
- Consider your receivers' feelings, values
  - Intelligence Quotient versus Emotional Quotient
- Choose an appropriate mode of transmission
- Time your message
- Listen for feedback
- Test to make sure message is understood



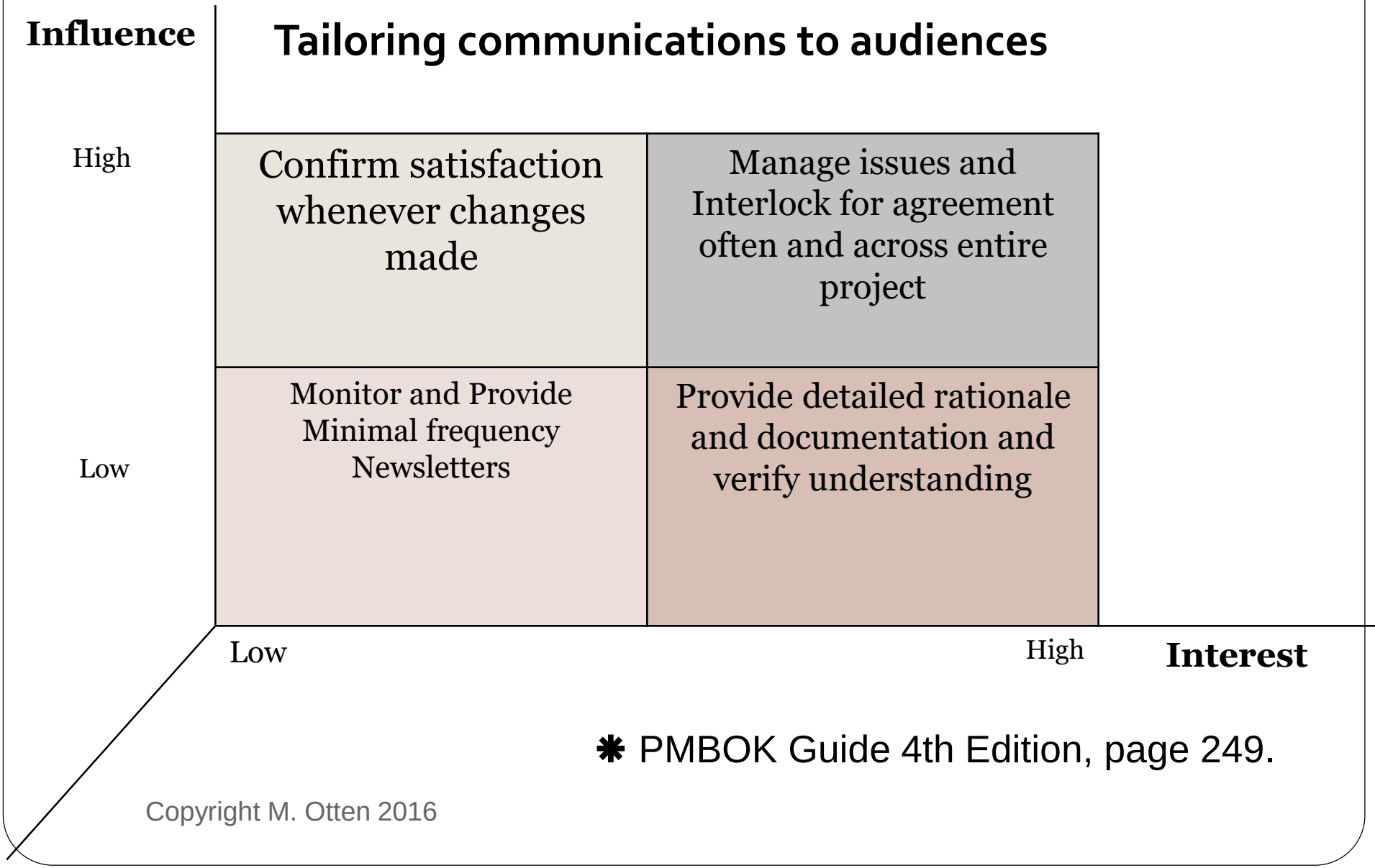
A few points on communicating across culture

- Language matters
  - 2nd language vs native speakers
  - Being louder is not the same as being smarter
  - Use translators and/or provide documentation back-up
- Cultures have their traits which are good to expect;
  - But be careful of stereotypes
- Knowledge of other cultures is always good
  - History, politics, manners

Communications Management

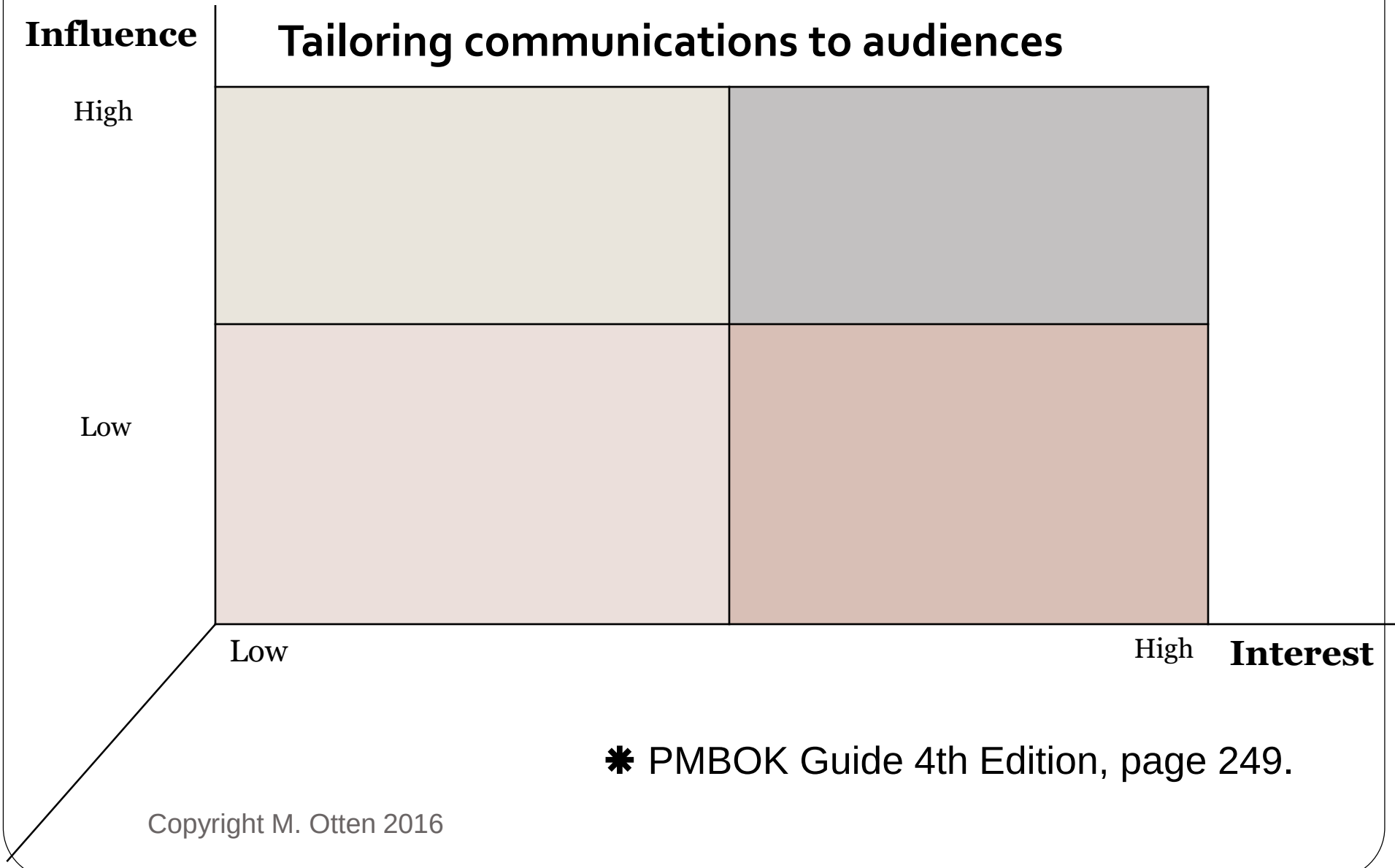
- Tailor Communications Vehicles to Stakeholder Profiles
  - Specify Documents, Recipients and Frequency
  - Differentiate: Sponsor, Customers, Project Team, Management
  - Provide detail at level appropriate for recipients
- Initial Communications
  - Project Description, Budget, Resources/Time-Line, Milestones
    - Goals, Business Case, Background of Problem, Project Structure, WBS
  - Schedule for Meetings, Reports and Key Deliverables
- Delivery according to Communications Plan
- Closure Report documenting Success and Short-falls
  - Short-falls or Failures worth documenting along with Successes

Communications Customization



❋ PMBOK Guide 4th Edition, page 249.

Communications Customization



❋ PMBOK Guide 4th Edition, page 249.

Class Exercise – Communication Plans

- Identify Stakeholders (not all)
  - At least one for each quadrant
- For Identified Stakeholders
  - Place each in appropriate quadrant
- 15 minutes to complete
  - Quality Control Manager to present to class
    - Brief explanation of why for one stakeholder per quadrant

Initial Program Communications Plan

- Stakeholder Communications Process Identified
  - Project Owner, usually same as Project Funder
  - Beneficiaries or Customers
  - Performers – roles by activity
  - Other Stakeholders
- Team Exercise to Structure Communications Plan

Key Success Factors

- **Congruence of Goals for various constituencies – good understanding of project Charter and outcome Expectations**
- **No Surprises – Change Management discipline**
- **WBS (work breakdown structure) - Tasks**
  - **Individual activities not too big or too small**
- **Individual tasks not too complex**
- **Positive Team culture**
- **Good Communications to all constituencies**

Team Project Status

- **Team Roles Identified**
  - **Consider workload balance, competing priorities**
- **Program Charter Developed**
  - **Final Report requires detailed Projects within Program**
- **Final Report needs to consider**
  - **Requirements**
  - **Prioritization of Tasks**
  - **Project Sign-off Acceptance Criteria**
- **Constraints Assumptions Considered**
  - **Documentation will be vital in final report**

Homework for next class

- **To submit prior to next class (~1 month) 6 March:**
  - **Table of Contents for Team Report & Stakeholder Communications Plan**
  - Detailed Gantt Chart for **Team Tasks**
  - PERT Charts for Team **Program Deliverables**
  - Send before class date in MicroSoft and/or PDF format to
    - **m.otten@ieee.org**

- **Present in class Team Tasks Plan with each team member explaining his role and deliverables.**

Technology Challenge

Educational Innovation Project!

Does everyone in class have access to Skype? I'm mxxo42

Each team should assign their Technology Contact to ensure that we are able to do the last sessions by Skype:

Team presentations to be scheduled afternoon of 20 March

6 and 13 March sessions to be discussed in class 6 February

Executive Guest Project Managers

Homework in context

- Deliverable due by Noon on due date
- Feb 6: Team Work Plan for LA ERP Program
  - Team member task assignments (WBS)
- Mar 6: Table of Contents for Team Report & Stakeholder Communications Plan
  - Detailed Gantt Chart for Team Tasks
  - PERT Charts for Team Program Deliverables
- March 13 Outline of March Presentation; Table of Contents for Team Report
- March 18: Draft of March Presentation
- March 20: Final PowerPoint of Presentations due by noon day before final class: Presentations by each team to be made in final class
- March 27: Draft of Report
- April 6: Final Exam
- April 13: Final Report due

Technology Confirmation

Technology contacts for each team to provide and test Skype access week of 6 February.

My Skype ID is mxxo42