When is Quantitative Project Risk Analysis Necessary?

How Effective Leaders Deploy @Risk for Excel / Project

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Las Vegas, Nevada

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Founder and Principal Consultant - Hornbacher Associates

Leadership Education Series

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Introduction

Today we will consider several aspects of our subject
- Context and evidence
- Value propositions
- Some “drill-down” examples

Overarching purpose - to increase knowledge and awareness

Keystrokes not the purpose today . . . we can continue discussion off line
Context and evidence
When is Quantitative Project Risk Analysis necessary?

■ The simple answer
  – When required by policy and/or prudent stakeholders
  – Much more to it, of course!
■ Will quickly address three specific matters
  1. Symptoms of failure when using single value (deterministic) project planning and estimating
  2. Evidence of an organization’s project risk management maturity
  3. Characteristics of organizations and leaders that successfully introduce quantitative methods to analyze project uncertainty and risk
✓ Then drill down into more detail, time permitting
“Comments” heard from project managers

It’ll all change anyhow!
You want me to schedule an invention???
More analysis paralysis . . .

*I want to know* the good, the bad, and the ugly . . .

. . . NOW!!!

How much knowledge is “enough”, really . . . ? – a skeptic
What is our value proposition?

- Value of **project risk management** is to use a disciplined approach to improve likelihood of successful delivery of project objectives by increasing favorable and decreasing unfavorable events.

- Value of **qualitative risk analysis** is to describe and document each risk in sufficient detail based on agreed upon characteristics to enable it to be understood and managed.

- Value of **quantitative risk analysis** is to assess combined effects of risks, prioritize, select and execute treatment plans that have best fit with organizational strategy.
If the client’s answer to “What’s the value of managing project risk?” is an objection, the challenge is deeper.
Project Risk – let’s define what we mean

Project Risk

... an uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives (Practice Standard for Project Risk Management, 2009)

... such as time, cost, scope, or quality ... and is defined by two attributes, likelihood of occurrence and impact if it occurs ...


- Project Management Institute (PMI®)
<table>
<thead>
<tr>
<th>Benefits</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Increase the likelihood of achieving objectives;</td>
<td>✓ Establish a reliable basis for decision making and planning;</td>
</tr>
<tr>
<td>✓ Encourage proactive management;</td>
<td>✓ Improve controls;</td>
</tr>
<tr>
<td>✓ Be aware of the need to identify and treat risk throughout the org.</td>
<td>✓ Effectively allocate and use resources for risk treatment;</td>
</tr>
<tr>
<td>✓ Improve the identification of opportunities and threats;</td>
<td>✓ Improve operational effectiveness and efficiency;</td>
</tr>
<tr>
<td>✓ Comply with relevant legal and regulatory requirements and</td>
<td>✓ Enhance health and safety performance, as well as environmental</td>
</tr>
<tr>
<td>international norms;</td>
<td>protection;</td>
</tr>
<tr>
<td>✓ Improve mandatory and voluntary reporting;</td>
<td>✓ Improve loss prevention and incident management;</td>
</tr>
<tr>
<td>✓ Improve governance;</td>
<td>✓ Minimize losses;</td>
</tr>
<tr>
<td>✓ Improve stakeholder confidence and trust</td>
<td>✓ Improve organizational learning; and</td>
</tr>
<tr>
<td></td>
<td>✓ Improve organizational resilience.</td>
</tr>
</tbody>
</table>
PMI® boils it down for us into 6 steps

1. Plan
2. Identify
3. Analyze – Qualitative
4. Analyze – Quantitative
5. Plan Responses [“treatment” per ISO 31000 and Systems Engineering]
6. Monitor and Control

Our **context** for discussing quantitative project risk analysis

1. **Identify**
2. **List**
3. **Assess, Analyze**
4. **Prioritize**
5. **Plan**
6. **Respond**

### Risk Register Initial

<table>
<thead>
<tr>
<th>Threats</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHI</td>
<td>VHI</td>
</tr>
<tr>
<td>HI</td>
<td>HI</td>
</tr>
<tr>
<td>MED</td>
<td>MED</td>
</tr>
<tr>
<td>LO</td>
<td>LO</td>
</tr>
<tr>
<td>VLO</td>
<td>VLO</td>
</tr>
</tbody>
</table>

### Risk Breakdown Structure (RBS)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>VLO</th>
<th>LO</th>
<th>MED</th>
<th>HI</th>
<th>VHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Plan and Manage the Process

- **Qualitative**
- **Trigger Parameters?**
- **Quantitative**

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**ATTENTION ARROW**

DYNM 605 *Managing Project Risk, Uncertainty, and the Unexpected* © 2012 Keith Hornbacher – All rights reserved
1. Symptoms of failure from single value (deterministic) thinking – name a few . . .
Challenges of overly optimistic plans

- Natural tendency for executives to compete for limited resources
- Rewards for precise execution
- Penalties for failure to anticipate difficulties or for failing to allow for difficulties that could not have been anticipated (unknown unknowns)
- However, may be rewarded by “buying in” and recovering on the changes . . . Sometimes a business strategy
The Planning Fallacy (Tversky and Kahneman*)

- Describes forecasts that
  - Are unrealistically close to best-case scenarios
  - Could be improved by consulting statistics of similar cases

Mitigating the planning fallacy

*The prevalent tendency to underweight or ignore distributional information is perhaps the major source of error in forecasting. Planners should therefore make every effort to frame the forecasting problem so as to facilitate utilizing all the distributional information that is available.*

– Bent Flyvbjerg, Oxford University

“Stuff” happens using wrong view of future

**Typical response**

- Risk - often expressed only in *qualitative terms* or single value.
  - Important to quantify risk in some methodical way to ensure a good allocation of resources for risk reduction
- Word models describe probability and impact meanings
  - High, medium, low (or variations)
  - Descriptive terms developed and agreed to by organization stakeholders

See *Systems Engineering (SE) Handbook* INCOSE-TP-2003-002-03.2.2 (FINAL 14Dec11), p 224-225
The qualitative process results in . . .

Plan

Define

Identify

Assessment

Analysis

Prioritization

Qualitative

Quantitative

Learn

Respond

Monitor

Control

Handle

Risk Register List

Risk Breakdown Structure (RBS)
## ATTENTION ARROW

<table>
<thead>
<tr>
<th>Prob.</th>
<th>Threats</th>
<th>Opportunities</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHI</td>
<td>T1</td>
<td>O1</td>
<td>VHI</td>
</tr>
<tr>
<td>HI</td>
<td>T2</td>
<td>O2</td>
<td>HI</td>
</tr>
<tr>
<td>MED</td>
<td></td>
<td>O3</td>
<td>MED</td>
</tr>
<tr>
<td>LO</td>
<td></td>
<td></td>
<td>LO</td>
</tr>
<tr>
<td>VLO</td>
<td>T3</td>
<td></td>
<td>VLO</td>
</tr>
<tr>
<td>VLO</td>
<td>LO</td>
<td>MED</td>
<td>HI</td>
</tr>
</tbody>
</table>

### Impact

- **VLO**: Very Low Impact
- **LO**: Low Impact
- **MED**: Medium Impact
- **HI**: High Impact
- **VHI**: Very High Impact

### Prob.

- **VLO**: Very Low Probability
- **LO**: Low Probability
- **MED**: Medium Probability
- **HI**: High Probability
- **VHI**: Very High Probability

---

**ATTENTION ARROW**

1. **Identified**
2. **Assessed, Analyzed**
3. **Prioritized**
4. **Plan Responses**

**ATTENTION ARROW**

T1
T2
T3

O1
O2
O3

**Impact**

**Opportunities**

**Threats**

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Qualitative assessment *always necessary* ~ *may be insufficient*
Quantitative methods preferred, but is the organization ready?

- Risk - often expressed only in *qualitative terms* or single value.
  - Important to quantify risk in some methodical way to ensure a good allocation of resources for risk reduction

- Ideal - characterize using cumulative probability curves with probability of failure and consequences expressed quantitatively in measurable terms

*Systems Engineering (SE) Handbook*, p 224-225
2. Evidence of an organization’s project risk management maturity
## Project Risk Management Maturity Matrix*

<table>
<thead>
<tr>
<th>Observable characteristics</th>
<th>Levels of maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>1. Ad Hoc</td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td>2. Initial</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>3. Repeatable</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
<td>4. Managed</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Collaboration Group (INCOSE, PMI, APM)
## Organizational Risk Management Maturity Matrix

<table>
<thead>
<tr>
<th>Project Risk Management</th>
<th>Level 1 – Ad Hoc</th>
<th>Level 2 – Initial</th>
<th>Level 3 – Repeatable</th>
<th>Level 4 - Managed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unaware of the need for management of uncertainties (risk).</td>
<td>Experimenting with risk management through a small number of individuals.</td>
<td>Management of uncertainty built into all organizational processes.</td>
<td>Risk-aware culture</td>
<td></td>
</tr>
<tr>
<td>No structured approach to dealing with uncertainty.</td>
<td>No structured approach in place but considering</td>
<td>Risk management implemented on most or all projects.</td>
<td>Proactive approach to risk management in all aspects of the organization.</td>
<td></td>
</tr>
<tr>
<td>Repetitive and reactive management processes.</td>
<td>Aware of potential benefits of managing risk, but ineffective implementation.</td>
<td>Benefits understood at all organizational levels, although not always consistently achieved.</td>
<td>Active use of risk information to improve organizational processes and gain competitive advantage.</td>
<td></td>
</tr>
<tr>
<td>Little or no attempt to learn from past projects or prepare for future projects.</td>
<td>Recognized Need to Accumulate Historical Uncertainty Data</td>
<td>Historical Lessons Captured, Use Limited to Some Projects</td>
<td>Top-down commitment to risk management, with leadership by example.</td>
<td></td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No risk awareness.</td>
<td>Risk process may be viewed as additional overhead with variable benefits.</td>
<td>Accepted policy for risk management.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No upper management involvement.</td>
<td>Upper management encourages, but does not require, use of Risk Management.</td>
<td>Benefits recognized and expected; risk viewed as opportunity as well as threat</td>
<td>Executive management uses risk information in decision-making.</td>
<td></td>
</tr>
<tr>
<td>Resistant/reluctance to change.</td>
<td>Risk management used only on selected projects.</td>
<td>Executive Management requires risk reporting.</td>
<td>Proactive risk management encouraged and rewarded.</td>
<td></td>
</tr>
<tr>
<td>Tendency to continue with existing processes even in the face of project failures.</td>
<td>“Bad news” risk information is tolerated.</td>
<td>Dedicated resources are funded to perform risk management.</td>
<td>Project managers' career path includes risk management training, experience.</td>
<td></td>
</tr>
<tr>
<td>Shoot the messenger.</td>
<td>“Bad news” risk information is tolerated.</td>
<td>Organizational philosophy accepts idea that people make mistakes.</td>
<td>Organizational philosophy encourages innovation.</td>
<td></td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal process.</td>
<td>No generic formal processes, although some specific formal methods may be in use.</td>
<td>Generic processes applied to most projects.</td>
<td>Risk-based organizational processes.</td>
<td></td>
</tr>
<tr>
<td>No Risk Management Plan or documented process exists.</td>
<td>Process effectiveness depends heavily on the skills of the project risk team and the availability of external support.</td>
<td>Formal processes incorporated into quality system.</td>
<td>Risk Management culture permeating the entire organization.</td>
<td></td>
</tr>
<tr>
<td>None or sporadic attempts to apply Risk Management principles.</td>
<td>All risk personnel located under project.</td>
<td>Active allocation and management of risk budgets at all levels.</td>
<td>Regular evaluation and refining of process.</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Collaboration among INCOSE Risk Management Working Group, PMI RiskSIG, UK Association for Project Mgt, RiskSIG, April 2002
<table>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Process (Cont'd)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attempts to apply Risk Management process only when required by customer.</td>
<td></td>
<td></td>
<td>Limited need for external support.</td>
<td>Routine risk metrics used with consistent feedback for improvement.</td>
</tr>
<tr>
<td>Limited need for external support. Routine risk metrics used with consistent feedback for improvement.</td>
<td>Risk metrics collected.</td>
<td>Key suppliers and customers participate in the Risk Management process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key suppliers participate in Risk Management process.</td>
<td>Direct formal communication channel to organization management.</td>
<td>Informal communication channel to organization management.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key suppliers and customers participate in the Risk Management process.</td>
<td>In-house core of expertise, formally trained in basic risk management skills.</td>
<td>All staff risk aware and capable of using basic risk skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct formal communication channel to organization management.</td>
<td>Development and use of specific processes and tools.</td>
<td>Learning from experience as part of the process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informal communication channel to organization management.</td>
<td>Regular training for personnel to enhance skills.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Experience</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No understanding of risk principles or language.</td>
<td>Limited to individuals who may have had little or no formal training.</td>
<td>In-house core of expertise, formally trained in basic risk management skills.</td>
<td>All staff risk aware and capable of using basic risk skills.</td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>No understanding or experience in accomplishing risk procedures.</td>
<td>Development and use of specific processes and tools.</td>
<td>Learning from experience as part of the process.</td>
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<tr>
<td>No understanding or experience in accomplishing risk procedures.</td>
<td>Regular training for personnel to enhance skills.</td>
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</tr>
<tr>
<td><strong>Application</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No structured application.</td>
<td>Inconsistent application of resources.</td>
<td>Routine and consistent application to all projects.</td>
<td>Risk ideas applied to all activities.</td>
<td></td>
</tr>
<tr>
<td>Inconsistent application of resources.</td>
<td>Risk-based reporting and decision-making.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No dedicated resources.</td>
<td>Qualitative risk analysis methodology used exclusively</td>
<td>Dedicated project resources.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No dedicated resources.</td>
<td>State-of-the-art tools and methods.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk management tools in use.</td>
<td>Integrated set of tools and methods.</td>
<td>Both qualitative and quantitative risk analysis methodologies used.</td>
<td>Both qualitative and quantitative risk analysis methodologies used with great stress on having valid and reliable historical data sources.</td>
<td></td>
</tr>
<tr>
<td>No risk analysis performed.</td>
<td>Integrated set of tools and methods.</td>
<td>Both qualitative and quantitative risk analysis methodologies used.</td>
<td>Both qualitative and quantitative risk analysis methodologies used with great stress on having valid and reliable historical data sources.</td>
<td></td>
</tr>
<tr>
<td>No risk analysis performed.</td>
<td>Both qualitative and quantitative risk analysis methodologies used.</td>
<td>Dedicated organizational resources.</td>
<td>Dedicated organizational resources.</td>
<td></td>
</tr>
</tbody>
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Adapted from Collaboration among INCOSE Risk Management Working Group, PMI RiskSIG, UK Association for Project Mgt, RiskSIG, April 2002
3. Characteristics of organizations and leaders that successfully introduce quantitative methods to analyze project uncertainty and risk . . .

Findings both anecdotal and research based
Some influencing characteristics

Organizational risk culture or attitudes towards project uncertainty observed to be both external and internal

- External
  - May vary by industry sector, life cycle phase
  - Nature of customers’ expectations; competition, environment

- Internal
  - Willingness to adapt, learn, and have consistency of action (discipline)
  - Commitment to resilience

See especially, Great by Choice by Collins and Hansen; and, Managing the Unexpected by Weick and Sutcliffe
Deployment of quantitative project risk analysis methods and tools
Enabling quantitative project risk analysis

- Leaders want to explore boundaries of knowledge
- Be open and trusting, yet accountable
- Protect fair minded candidness
- Encourage disclosing experiences (failures, too)
- Deploy valid tools and methods
- Educate and train subject matter experts, teams
Enabling quantitative analysis (continued)

- Recognize plans can create blind spots
- Visualize project as system of systems that can be modeled
- Discourage single value estimates, favor those that describe uncertainty and risk
- Results enable stronger response actions

Far beyond awarding a “grade”
Frequently encountered objections

- Limited by inherent lack of data, analysis capability
  - Ideal of quantitative method is usually impractical
- Important to properly quantify risk
  - Invalid assessment could lead to improper conclusions with misapplication of resources
- Projects often compromise by using “monetary expected value” model (taught universally)
  - “A somewhat subjective, relative rating”

Risk = Probability of failure (Pf) * Consequence of failure (Cf)

For some, ”passes” as quantitative analysis

- SE Handbook, p 224-225
Starting point for serious quantitative project risk analysis: valid plans, estimates

- Must use professionally recognized best practices
  

- Tasks/activities, resources, costs, responsibilities well defined and documented
  - Entrance, exit criteria identified, work quantified
  - Dictionary, log entries, deliverables identified by place in work breakdown structure (WBS); risk responses planned, funded
  - Resources identified, loaded, costs applied

- **Proven software tools** in use by trained, experienced staff

- Baseline is/will be established, current data maintained and compared
When is quantitative analysis necessary?

- Required by governance, policy; Risk Management Plan parameters met
- *Combined effects* of risks on objectives important
- *Complex interactions* exist among risks
- Team, organization has or can obtain requisite tools, expertise
- Leaders want to know
Value added during planning

- **Bid – No Bid (before decision to compete)**
  - Program / project risk analysis, a risk analysis of competing alternative plans defined by logical relationships
  - Identify and assess strategic, high level feasibilities, durations and costs – a quantitative high level “Risk Model”
  - Prioritize “Risk Drivers” and test alternative treatment strategies

- **Proposal (after decision made to compete)**
  - More elaborate risk model development; Bid/No-Bid risk model (logic network) provides the proposal team with capture rationale and a point of departure for the proposed program development
  - Detail added to substantiate approach and refine variables
Risk model of plan – “test bed” before execution

- Base on project plan logic and uncertainties
- Identify, map, and assess risks
- Test alternative treatment plans

Path with **Conditional** Branch

Decision Milestone

Contingency Plan

Notional Project Risk Model

Target Finish
Reality – Some paths need contingency plans

Probabilistic Branch

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Value added during execution

- **Contract Award, Start-up**
  - Refinement of Integrated Master Schedule (IMS) from “as-proposed“ benefits from previous work performed with the risk model
  - Base-lined (approved) IMS more or less aggressive than “as-proposed “schedule
  - Evolves into Risk Model, a “Program/project test bed” for assessing the base-lined IMS PLUS proposed changes

- **Stage Gates, periodic Schedule Risk Analysis (SRA)**
  - Assessment of current schedule risk often Contract Data Item Requirement List (CDRL) deliverable [see Data Item Description]
  - Entry point of organizations early on learning curve of quantitative risk analysis
Program/project external, internal influences

- Life cycle maturity (concept, development)
- Size, complexity, urgency
- Maturity of organization’s risk management methods, policies, experience
- Organizational/environmental culture present during performance of quantitative risk analysis (voluntary/motivated, compliance/imposed . . .)
- Flexibility of performance (does an IMS Data Item Description govern?)
- Sophistication of client team members and leaders
- Previous experience with methods identified by key team members (rightly or not) to be similar to quantitative risk analysts
- Existence of motivational bias
- Time available to deliver the required analysis

- Excerpt from Unpublished White paper, Keith Hornbacher, November 2010
Models can work

Risk is often expressed only in qualitative terms or by a single value. Therefore, it is important to quantify risk in some methodical way to ensure a good allocation of resources for risk reduction. Ideally, risk would be characterized using cumulative probability curves with the probability of failure and the consequences expressed quantitatively in measurable terms. However, given the inherent lack of data and limited analysis, this is usually impractical. It is important to properly quantify risk because an invalid assessment could lead to an improper conclusion with misapplication of resources.

Discussion of case examples follows

SE Handbook, p 224
Output for communication and feedback

Risk Register Updated: Response Plans

Network Logic Risk Model

RBS Risks Grouped

Output Distributions

Cost-Schedule Scatter Plot
The best way to predict the future is to create it.

- Peter F. Drucker
Background
HORNBACHER ASSOCIATES

- Purpose: enable clients to successfully manage project risk and uncertainty
- Founded in 1993; private and public sector clients
  - Previously with Los Angeles based firm, proprietary MC software (1984-1993)
- Educational institution affiliation (University of Pennsylvania from 2005)
- Team with other subject matter experts (such as Hulett & Associates, LLC)

Palisade software deployed from the very early years

Today’s context is use of @Risk for Excel / Project
Institutional context

University of Pennsylvania is located in Philadelphia

- Recognized as America’s first university
- Founder Benjamin Franklin, 1740 ~ 1751
- Students (Fall 2011), Total ~ 25,000
- 12.4% of applicants for class 2015 were offered admission
- Student to faculty ratio is 6:1
- Schools
  - Undergraduate (4)
  - Graduate and Professional (12)
- Private university (not part of state system)

Source: http://www.upenn.edu
Graduate degrees MSOD and MPhil

Six areas of concentration – graduate studies in

- Coaching and Consulting
- Global Organization
- Leadership/Management
- Practitioner/Development and Change
- Sustainable Development
- Projects, Programs, and Portfolios

Source: http://www.organizationaldynamics.upenn.edu
Projects, Programs, and Portfolios ($P^3$) in 7th year

- Limit of 20 per course (enables interactive dialogue)
- Core Courses
  - Organizational Project Management
  - Program Leadership
  - Managing Project Portfolios
  - Managing Project Risk, Uncertainty, and the Unexpected ($DYNM-605$)
    - Teams of students – project selected is used throughout semester
    - Introduced Palisade tools Fall 2011: Decision Tools Suite and @Risk for Project
    - Various tools are discussed at Penn for context
- Electives, Practicum, and Capstone

- MS concentration; and certificate $P^3$ Leadership Professional (PLP)

Source: http://www.organizationaldynamics.upenn.edu
DYNM-605 student demographics include

- Mid to senior level career professionals (domestic and foreign) seeking graduate degrees
  - Pharmaceuticals
  - Aerospace/defense
  - Public utilities
  - Healthcare
  - Financial institutions (banks, insurance, investment, M&A firms)
  - High tech
  - Other Penn graduate programs
  - Governmental bodies (local, state, federal)

http://www.organizationaldynamics.upenn.edu/dynm-605-12c
1)  **15 Sep**  Course Conduct, Virtual Communications; Tools*; Introduction to Managing Project Risk, Uncertainty, and the Unexpected; Risk Attitudes, Organizational Cultures; Common Heuristics; Risk Management Maturity (RMM) Matrix

2)  **29 Sep**  Survey of Project Risk Management Methods Across Global and Domestic Private and Public Sectors, Industries; Definition and Planning

3)  **13 Oct**  Identification of Risks; Root Cause Projection, Risk Breakdown Structures (RBS) and Registers

4)  **27 Oct**  Prioritization, Assessment: Qualitative Analysis

5)  **10 Nov**  Planning Responses; Dynamics of Project Risk Cultures

6)  **17 Nov**  Monitoring, Control, Review; Organizational Learning

   **Thanksgiving Holiday 22 November**

7)  **01 Dec**  Governance Models; Challenges Facing Virtual Teams; Organizational Dynamics of Project Risk Cultures; Intro to Estimating to Time and Cost Uncertainty; Data Collection and Quality

8)  **08 Dec**  Prioritization (advanced), Intro to Quant Cost-Schedule Risk Analysis; Discussion of Unexpected; Course Wrap-up
When is Quantitative Project Risk Analysis Necessary?

How Effective Leaders Deploy @Risk for Excel / Project

Palisade Risk Conference November 7, 2012

Las Vegas, Nevada

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Leadership Education Series