Software Project Management
CS6704: Class 9

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Agenda

◆ Discussions
  • Turn in Homework
  • Midterm Discussion
  • Reading Discussion
  • Review last week's class
◆ Break
◆ Risk Management Practice Improvement
◆ Homework/Project Assignment
Fall Semester Timeline

Class Begins PM Basics
Managing with Metrics
Emerging PM Paradigms
Software Project Planning
Mid-Term Exam
Program Management
Final Exam
Software Estimation
Risk Management
Human Side of PM
Project Portfolio Management

Aug — Sept — Oct — Nov — DEC

9 weeks, 6 sessions... So much to do & so little time ... When is the Final? 😊

Reading Discussions...

- Chapter 7 “Risk Management”
- “Large-Scale Project Management is Risk Management” by Robert Charette
- “Managing Risk in SW Maintenance” by Robert Charette
- “Implementing Risk Management ...” by Edmund Conrow
Software Projects are about Risk

- Risk translates to:
  - Lack of ???
  - Lack of ???, and/or
  - Lack of ???
- Risk = F(impact X ???)
- Failure to act on opportunity can create more future risk

Banker’s Risk
Investor’s Risk
Gambler’s Risk

Basic IT Value Proposition

\[ Value = \frac{???(IT \text{ Drivers})}{???(Market)} \]

- Reduce Risk
- Increase Customer Satisfaction
- Reduce Cycle Time
- Increase Productivity

IT value is proportional to the degree it ??? or ??? value of the information that it delivers
**Business Perception of IT Value**

- **Recognized Dependency on Information**
  - **Perceived Capability of IT**
  - **Business Cost**
    - Low
    - High
  - **Business Opportunity**
    - Low
    - High

**Example: Delivery Risks**

- **Good-Fast-Cheap:** *Pick Good and Fast!*
- **Delivery Risk** is a function of
  - ??? of Loss (LL) and ??? of Loss (ML)

**Example: Operational Dependability**

\[
Risk = \sum (LL \times ML)
\]
Example: Delivery Risks (continued)

Now Overlay “Fast” -- Aggressive Schedule associated with Delivery in Internet Time

![Risks vs. Delivery Deadline graph]

Many defects: high LL
Critical defects: high ML

Few defects: low LL
Weak defects: low ML

Target Risk Zone

Key risks:
- Many ???: high LL
- Strong ???: high ML

Initiative Risk Likelihood

![Likelihood of risks graph]

Key risks:
- Poor Leadership
- Key Staff Turnover
- Technology Mis-Selection
- Inadequate Transition Planning
- Poor Requirements Management
- Poor Relationship Management
- Cost/Schedule Overruns
- Inadequate Project Planning
- Duplication of effort
- Poor Sponsorship
- Poor Coordination with Business
- Poor Coordination with Business
Targeting Risk/Return Zone

???
- "Customer Satisfaction"
- "Strategic Alignment"
- "Flexibility"
- "Information Quality"

???
- Productivity in Activity "A"
- Errors in Decision "D"
- Cycle Time of Process "C"
- Project slip rate...

Project Risk/Return

Stay within the Risk ???!

Defined Investment Limit

Region of Value

Investment

Architecture Bridges the Gap

???
- ??? Architecture
- ??? Architecture
- ??? Architecture
- Application Portfolio
- ??? Architecture
- ??? Architecture

Business Strategy
Environmental Forces
Business Goals
Business Policy
Resource Allocation

Implementation
Business Processes
Application Systems
Technical Infrastructure
Organizational Structure

Enterprise architecture bridges strategy to implementation and reduces risks
Enterprise Architecture Perspective

Why do these 2 constituencies need to collaborate on Risks?

Reactive Risk Management

- Project team reacts to risks when they occur
- ???—plan for additional resources in anticipation of fire fighting
- Fix on ???—resource are found and applied when the risk strikes
- ??? management—failure does not respond to applied resources and project is in jeopardy
Basic Risk Management Paradigm

- C???: how can we avoid the risk?
- T???: what factors can we track that will enable us to determine if the risk is becoming more or less likely?
- I???: what contingency plans do we have if the risk becomes a reality?
- A???: what???
Attributes that Affect Risk

- Product Size?
- Business Impact?
- Customer?
- Process Maturity?
- Technology?
- Staff/People?

Schedule Overrun Risk Areas

▲ Cost overruns routinely tied to Schedule overruns
▲ Primary contributors to schedule overruns:

- Contractual
- Requirements
- Management
- Resources
- Process
- Staffing
- Testing and Integration
Sample Risk Analysis Sheet

<table>
<thead>
<tr>
<th>System</th>
<th>Impact</th>
<th>Exposure</th>
<th>Resources</th>
<th>Requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus 1</td>
<td>H</td>
<td>L</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Bus 2</td>
<td>H</td>
<td>M</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Infr 1</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>M</td>
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<tr>
<td>Infr 2</td>
<td>M</td>
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<td>Adm 1</td>
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<tr>
<td>Adm 2</td>
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</tr>
</tbody>
</table>

- ▲ Why map all the risks in a risk table or sheet?
- ▲ What perspectives must be considered?

Example Software Project
Risk Reduction Activities

- Thorough ???_??? prior to strategy selection
- Realistic ???
- Adherence to development standards
- Incremental software development
- Early development of difficult software
- Early compilation of interfaces
- Visibility into timing and sizing from onset
- Extensive use of software ??? metrics
- Frequent face-to-face communications
- Periodic audits
IEEE Risk Management

- Based on IEEE Risk Standard
- Chaired by Robert Charette

Evaluate the Risk Management Process

Technical and Management Processes
  - Perform Risk Treatment
  - Perform Risk Analysis
  - Perform Risk Monitoring

Manage the Project Risk Profile
  - Project Risk Profile & Risk Actions Requests

Evaluate the Risk Management Process
  - Feedback
  - Improvement Actions

Project Risk Profile

Information Needs

Business View: IT-Intensive Initiatives

- Business-Triggered Technology Initiatives
  (CRM, ERP, E-Business, …)
- Event-Triggered Initiatives
  (Y2K, Euro, M&A, Reorgs, …)
- Technology Infrastructure Initiatives
  (Network Upgrades, Data Center Consolidation, …)
- Modernization Initiatives
  (Legacy Consolidation, Stove-Pipe Integration, …)

Software project managers must manage manifold risks induced by the growing portfolio of IT initiatives
From Reactive to Anticipatory Management

**Common Practice**

- Focusing on projects like winning a battle
- Meeting "crunch mode" deliverables
- Planning/Tracking for Project Accountability
- Excusing Failure or Rationalizing Success after Delivery
- Sacrificing quality at the alter of schedule

**Emerging Practice**

- Focus on Value in Business Context
  - Economies of Scale
  - Manifold Risk of Multiple Initiatives
- Navigation through leading indicators
  - Scorecards and Dashboards
- Active Project/Program Management

**Performance Managed**

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**Prog. Mngt. Capability Maturity Model**

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Key Process Area Concentrations</th>
<th>Strategic Inflection Point</th>
<th>Effective Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Incorporated</td>
<td>Value Management, Business Continuity Planning, Procurement Management, Outsourcing and Contract Management, PM Center of Excellence</td>
<td>Integration with Business</td>
<td>Enterprise/Industry</td>
</tr>
<tr>
<td>4 Managed</td>
<td>Program Process Management, Project Integration Management, Project Performance Management, Vendor Management, PM Career Path, Staff Performance Management, Customer Relationship Management, Contingency Management, Communications Management</td>
<td>Dynamic Micro-Level Change</td>
<td>Multiple Business Units</td>
</tr>
<tr>
<td>3 Defined</td>
<td>PM Methodology, Skill Management, PM Training, Risk Management, Change Management, Staff Resource Management, Environment Resource Management,</td>
<td>Static Macro-Level Change</td>
<td>Multiple Project</td>
</tr>
<tr>
<td>1 Initial</td>
<td>Acquiring New PMs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Risks and Value of Business Imperatives Pivot on E-Intensity

- With unprecedented economic change and technology demand...
  - Entered an era of IT intensive business initiatives
  - Techno-Darwinism spawning new species of entrepreneurial firms
- Risk always precedes opportunity... PMOs are about managing risks to capitalize on value

Moving Up The Program Management Maturity Scale

- 80+% of organizations are at Level 1 but anticipate operating at Level 4
- Moving up the maturity scale requires discipline and investment
- PMOs Advance Levels at Strategic Inflection Points
- Many synergies between IT and business - High ROI

Scale of strategic initiatives like E-Business forces firms to advance their program management capability
Building PM Foundation

PMO-CMM Level 2: Getting the Basics Right
- Planning
- Estimation
- Tracking
- Risk Identification
- Schedule Management
- Budget/Cost Management
- Scope Management
- Progress Reporting

Advancing to Level 2 stabilizes performance by instituting the basics of Project Management

PMO-CMM Level 3: Macro-Level Performance Focus
- PM Methodology
- Staff Resource Management
- Skills Management
- PM Training
- Risk Management
- Change Management
- Environment Management
- Conflict/Issue Management

Reaching Level 3 increases multi-project performance by focusing on high-payoff practices in Key PM Areas
PMO-CMM Level 4: Micro-Level Performance Tuning

- Program Process Mgt.
- Project Integration Mgt.
- Project Performance Mgt.
- Vendor Mgt.
- PM Career Path
- Staff Performance Mgt.
- Customer Relationship Mgt.
- Contingency Mgt.
- Communications Mgt.

Attaining Level 4 targets cross-constituency initiative improvements by targeting “PM in the large” issues

PMO-CMM Level 5: Integrating PMO with the Business

- Value Management
- Business Continuity Planning
- Procurement Management
- Outsourcing and Contract Management
- PM Center of Excellence

Targeting Level 5 means making project value integral to the executive decisions -- at the speed of business
## Maturing PM Dashboard Metrics

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Dashboard Metrics Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Incorporated</td>
<td>Value Leveraged/Value at Risk, Return on IT, Return on Management, Business Risk Reserve, Contract Cost Savings, Contract Cycle Time, Portfolio Capitalization Level, PM Intellectual Capital, Return on Training</td>
</tr>
<tr>
<td>4 Managed</td>
<td>Delivery Throughput, Process Improvement Rate, Applications Life Cycle Cost, Cost of Applications Management, Total Program Performance, Volume Purchase Savings, Maintenance/Development, Workload Ratio, Project Approval Delays, Integration Testing Cycle Time, PM Advancement Rate, Cost of Integration, Project Success/Failure Rate, Customer Satisfaction</td>
</tr>
<tr>
<td>3 Defined</td>
<td>Schedule Productivity, Cost Productivity, Resource Utilization, Experience and Skills Growth, Average Team Size, Voluntary Turnover, Remaining Risk Reserve, Configuration Churn, Issue Resolution Rate</td>
</tr>
<tr>
<td>2 Stable</td>
<td>Planned versus Actual Effort, Cost, and Schedule, Slip Rates, Requirements Change Rate, Scope Creep, Number of Risk Exposures (i.e., red, amber, green)</td>
</tr>
</tbody>
</table>

## Move IT Up The Program Management Maturity Scale

- Get executive commitment and leadership through value proposition of PMO maturity
  - PMO Maturity reduces risks, increases value
- Be prepared to introduce discipline and structure to PM practices to realize gains
  - Must be willing to go the “Hero’s Journey”
- PMOs must become “Risk Entrepreneurial”
  - Balancing Risk and Value in business terms

**Business Impact:** Advancing up the PMO maturity scale is about increasing executive confidence that key IT enabled corporate initiatives are successful.
Enterprise PMO Position in the Organization

- Enterprise PMO Reports to CIO
- Thematic and LOB PMOs are subordinate to Enterprise PMO
- Portfolio of Programs/Initiatives of Projects

PM Dashboard in the Context of Business Value Stream

Supplier → Customer

Business Product Stream

- Business Result
- Business Process
- Business Application
- Initiative/Project

Performance Information Stream

Customer Service

Manufacturing
Marketing
Distribution
Sales

Business Performance
Business Process Performance
Business Application Performance
Portfolio Performance
PMO Standings in the IT Value Race

Following the Pack 30%
- No PMO
- IT managed as a cost
- Mainframe based
- Long development lead times
- Little flexibility

In the Pack 55%
- Level 1-2 PMO
- Spending growth but not managed
- Distributed computing growth w/uncontrolled complexity
- Strategic work content low

Competitive 10%
- Level 3-4 PMO
- Spending under control
- Portfolio is managed
- Development effective
- Strategic content high

Leading 5%
- Level 5 PMO
- Spending managed as an investment
- Package based solutions leveraged
- Sourcing leveraged
- “Change Ready” mindset