PERFORMANCE AND QUALITY IN PROJECTS

Project Management and Leadership – 2016
PROJECTS PROGRESS WELL UNTIL ‘70%’

Quick progress until 60-70% complete.

Then we discover the project is in distress.

(mod. KERZNER 2011, p.48)
A PROJECT IS IN DISTRESS, IF

It exhibits a performance trend that, continued, will result in failure
Its performance has exceeded metric values and is a high risk for failure
It has recently experienced a significant change that may result in failure

(mod. WYSOCKI 2014, p.448)
WHY PROJECTS BECOME DISTRESSED?

Poor, inadequate, or no requirements documentation
Complexity of requirements not recognized
Unmanageable project scope
Inappropriate or insufficient sponsorship
Unwillingness to make (tough) decisions
Lag time between project approval and Kick-Off
No credibility in the baseline plan
No plan revision after significant cuts in resources
Estimates done with little planning or thought

(mod. WYSOCKI 2014, pp.449-452)
WHY DO WE SEE IT LATE?

No metrics
Wrong metrics
Fear of what health checks may reveal

(mod. KERZNER 2011, p.48)
A PROJECT IS A SYSTEM

It can get out of balance
The longer we wait to fix, the longer it takes to return to equilibrium
The controls must be designed to discover out-of-balance situations early and put get-well plans in place quickly.

(mod. WYSOCKI 2012, p.280)
HIGHLIGHTS:

1. PROJECTS PROGRESS ‘WELL’ UNTIL THEY ARE ‘70%’ COMPLETE
2. PROJECT FAILURE IS A PROCESS THAT OFTEN STARTS AT THE BEGINNING
3. WE RECOGNIZE PROBLEMS LATE BECAUSE WE DO NOT MEASURE
EARNED VALUE MANAGEMENT (EVM)

A method of performance measurement integrating project scope, cost, and schedule measures to help assess and measure project performance and progress.

EVM develops and monitors three key dimensions for each work package and control account:

   - PLANNED VALUE (PV)
   - EARNED VALUE (EV)
   - ACTUAL COST (AC)
THE KEY DIMENSIONS

**PLANNED VALUE (PV):** the authorized budget assigned to the scheduled work to be accomplished for a schedule activity or work breakdown structure component.

**EARNED VALUE (EV):** the value of work performed expressed in terms of the approved budget assigned to that work for a schedule activity or work breakdown structure component.

**ACTUAL COST (AC):** total costs actually incurred and recorded in accomplishing work performed during a given time period for a schedule activity or work breakdown structure component.
VARIANCES FROM THE BASELINE

**SCHEDULE VARIANCE (SV):** a measure of schedule performance – $SV = EV - PV$. Can indicate a project falling behind its baseline schedule.

**COST VARIANCE (CV):** a measure of cost performance – $CV = EV - AC$. CV at the end of the project will be the difference between the budget at completion (BAC) and the actual amount spent.

CV is particularly critical because it indicates the relationship of physical performance to the costs spent.
PERFORMANCE INDEXES

**SCHEDULE PERFORMANCE INDEX (SPI):** a measure of progress achieved compared to progress planned. $\text{SPI} = \frac{\text{EV}}{\text{PV}}$. SPI<1.0 indicates less work was completed than was planned. SPI>1.0: more work was completed than planned.

**COST PERFORMANCE INDEX (CPI):** a measure of the value of work completed compared to the actual cost or progress made. $\text{CPI} = \frac{\text{EV}}{\text{AC}}$. Is considered the most critical EVM metric and measures the cost efficiency for the work completed. CPI<1.0 indicates a cost overrun for work completed. CPI>1.0: cost underrun of performance.
COST/SCHEDULE PERFORMANCE

Months of the project life

(NICHOLAS 2008, p.437)
### CALCULATE THE EVM VALUES

<table>
<thead>
<tr>
<th>PLANNED</th>
<th>Situation I</th>
<th>Situation II</th>
<th>Situation III</th>
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<tr>
<td>EAC</td>
<td>≡ PV</td>
<td>10,000,00</td>
<td>20,000,00</td>
</tr>
</tbody>
</table>

SV = EV – PV  
CV = EV – AC  
SPI = EV/PV  
CPI = EV/AC  
EAC = BAC/CPI
LIMITATIONS OF EVM METRICS

TIME and COST are basically the only two metrics
QUALITY and VALUE of the project cannot be calculated
Completing a project within time and cost does not imply success
No information for corrective action
Stakeholders do not always understand the meaning of the metrics.

(mod. KERZNER 2011, p.70)
HIGHLIGHTS:

4. EARNED VALUE MANAGEMENT AIMS TO MEASURE PROJECT PERFORMANCE BY INTEGRATING SCOPE, COST, AND SCHEDULE

5. PLANNED VALUE, EARNED VALUE AND ACTUAL COST ARE ITS KEY DIMENSIONS

6. EVM HAS MANY LIMITATIONS
THE PROJECT MANAGEMENT TRIANGLE

- TIME
- COST
- SCOPE
- QUALITY
QUALITY

Degree to which a set of inherent characteristics fulfills requirements
QUALITY REVOLUTION

PAST
The responsibility of workers
Defects should be hidden
Quality problems lead to conflicts
Corrections should be minimally documented
Increased quality will increase project costs
Quality is internally focused
Quality will not occur without close supervision
Quality occurs during project execution

PRESENT
Everyone’s responsibility
Defects should be brought to the surface
Quality problems lead to cooperative solutions
Documentation is essential for “lessons learned”
Improved quality saves money
Quality is customer focused
People want to produce quality products
Quality occurs at initiation and must be planned for

(mod. KERZNER 2009, p.874)
GRADE

A category assigned to products or services having the same functional use but different technical characteristics
CRITICISMS OF CITATION COUNTS

1. Scientific quality is a complex phenomenon and cannot be measured on a one-dimensional scale
2. Authors cite publications that have had little intellectual influence on their paper
3. Authors do not cite many that have had
4. Authors overlook relevant publications
5. Researchers use publication strategies distorting ‘bibliometrics’
6. Citations databases cover only a part of publications
7. The publication must be read and assessed

(mod. BORNMANN et al. in CRONIN & SUGIMOTO 2014, p.217)
HIGHLIGHTS:

7. QUALITY IS THE DEGREE OF FULFILLING REQUIREMENTS
8. VIEWS OF QUALITY HAVE PROFOUNDLY CHANGED SINCE 1950s
9. GRADE CAN BE HIGH, BUT QUALITY – LOW.
QUALITY MANAGEMENT PROCESSES

1. PLAN QUALITY
   identify quality requirements and/or standards for the project and product, and document how the project will demonstrate compliance

2. PERFORM QUALITY ASSURANCE
   audit the quality requirements and the results from quality control measurements to ensure appropriate quality standards and operational definitions are used

3. PERFORM QUALITY CONTROL
   monitor and record results of executing the quality activities to assess performance and recommend necessary changes
HOW TO PLAN

COST-BENEFIT ANALYSIS
COST OF QUALITY
BENCHMARKING
FLOWCHARTING
PROPRIETARY QM METHODOLOGIES
COST OF QUALITY (COQ)

The total cost of quality-related efforts and deficiencies

https://en.wikipedia.org/wiki/Quality_costs

The sum of conformance and nonconformance costs

(BLOCHER et al. 2010, p.761)
## COQ’S COMPONENTS

### COSTS OF CONFORMANCE:
- Prevention costs
  - Training
  - Quality programs (plan and execute)
  - Investments (improve and redesign)
- Appraisal costs
  - Inspection
  - Testing

### COSTS OF NONCONFORMANCE:
- Internal failure costs
  - Rework
  - Reinspection
  - Corrective action costs
- External failure costs
  - Replacement
  - Product recall and liability
  - Reputation
  - Lost sales and ill-will

(BLOCHER et al. 2010, pp.758-763)
OUTPUTS OF QUALITY PLANNING

QUALITY MANAGEMENT PLAN
QUALITY METRICS
QUALITY CHECKLISTS
PROCESS IMPROVEMENT PLAN
PROJECT DOCUMENT UPDATES
QUALITY METRIC

An operational definition that describes, in specific terms, a project or product attribute and how the quality control process will measure it.

A MEASUREMENT – its actual value,
TOLERANCE – allowable variations of the metrics.
CONTINUOUS IMPROVEMENT PROCESS (CIP)

A closed-loop cycle of sequential steps designed to bring about continual improvement through a process of
(1) DISCOVERY,
(2) APPLICATION,
(3) REVIEW,
(4) CORRECTIVE ACTION.

The Shewhart cycle (Plan-Do-Review-Act), Six Sigma’s DMAIC (Define-Measure-Analyze-Improve-Control), and TOC’s Five Focusing Steps (5FS) are among the best known methodologies.

(COX & SCHLEIER 2010, p.404)
HOW TO PERFORM QUALITY ASSURANCE

QUALITY AUDITS
PROCESS ANALYSIS
A QUALITY AUDIT

A structured review to determine whether project activities comply with organizational and project policies, processes, and procedures.

ITS OBJECTIVES:
- Identify all the good/best practices being implemented
- Identify all the gaps/shortcomings
- Share the good practices introduced/implemented
- Proactively offer assistance to improve implementation
- Highlight contributions of each audit in the lessons learned repository.
OUTPUTS of PERFORM ASSURANCE

PROJECT MANAGEMENT PLAN UPDATES
CHANGE REQUESTS
HOW TO PERFORM QUALITY CONTROL

INSPECTION
STATISTICAL SAMPLING
PARETO CHART
PARETO CHART

A histogram, ordered by frequency of occurrence, that shows how many results were generated by each identified cause.

Illustrates the ‘80/20’ rule.
“89% of [year 2004 citations of Nature papers] was generated by just 25% of our papers”

(EDITORIAL. Nature 2005;435:1004)
HIGHLIGHTS:

10. QM CONSISTS OF PLANNING, CONTROLING AND (!) ASSURING
11. COST OF QUALITY: NONCONFORMANCE COSTS ARE ALWAYS HIGH
12. PARETO CHART ILLUSTRATES THE UBIQUITOUS ´80/20´ RULE