Experiences with a Geographically Distributed CMMI Class C+ Appraisal

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ABB Overview

- Leader in power and automation technologies
- Enable utility and industry customers to improve performance while lowering environmental impact
- The ABB Group of companies operates in more than 120 countries and employs approximately 110,000 people
- ABB became the first company in the world to sell 100,000 robots
- Most ABB products have both software and hardware components
- ABB Corporate Research (CR) partners with business units (BU’s) worldwide to improve ABB’s products, services, and development processes.
Customer: an ABB business unit (BU)**

Provider: ABB Corporate Research (CR)

- BU improvement goal:
  - ‘Raise the floor’ at 3 US sites sharing a common Quality System and building a shared set of organizational processes and tools

- “Class C+” appraisal purpose:
  - Objectively evaluate progress of the US organization relative to CMMI ML2 (v1.2) – as 1 organization, not 3
  - Class C + interviews, to increase confidence in accuracy

- Initially planned appraisal team composition:
  - 2-3 CR participants (software research/consulting)
  - 3 BU participants (1 from each site)

** BU is not named or characterized, and specific outcome data has been partially sanitized, for confidentiality reasons.
Appraisal Background – 2

**Challenging factors:**

- **Geographic**
  - Distributed organization (3 US sites in 3 different time zones)
  - Part of a global division; a few key support functions recently centralized for all of US

- **Organizational**
  - Some common processes, some site-unique
  - Managers with multi-site or global responsibilities
  - Different types of projects, executed somewhat differently at each site

- **CMMI awareness**
  - Varying degrees of prior CMMI experience across BU
  - BU1 and BU2 participants had no prior experience as appraisal team members; BU2 was fairly new to CMMI
  - No opening or closing session desired
Appraisal Background – 3

**Mitigating factors:**

- **CMMI awareness:**
  - 1+ prior Class B/C appraisals by CR at each BU site *(wide awareness of CMMI within BU)*
  - BU3 participant had prior Class B appraisal team member experience
  - All CR participants experienced on/leading several CMMI appraisal teams *(general and with this BU)*

- **Organizational:**
  - Core BU improvement coordination team was established and involved (EPG)
  - Increasing progress in BU towards common processes and shared document repository

- **Geographical:**
  - *None?*
Appraisal Strategy

Usual approach: All BU+CR appraisal team members travel, to all 3 locations, in turn

😊 Maximizes mentoring, F2F interviewing at sites, and in-person appraisal findings generation by team

😢 Costly in outlays, appraisal team member time, and schedule

Could we meet our appraisal goals with a leaner strategy involving less travel, time, and cost?

We labeled this usual approach “option A”, and began examining some alternative options for conducting the interviews and appraisal.
Interview Logistics – 1

Key concerns on remote vs. on-site interviews:

1. Minimize time demands for appraisal participation, plus travel costs, for BU
   - Schedule coordination was a major challenge

2. Interviewing effectiveness and accuracy
   - Full engagement of all FAR participants is always a challenge, even when entire team is on-site!

3. Maximize mentoring of BU appraisal team members (BU1 & BU2) by CR

4. Efficient findings generation by appraisal team

FAR = Functional Area Representative group (interviewees)
Interview Logistics – 2

Options for remote vs. on-site interviews:

A. All BU+CR appraisal team members travel, to all 3 locations, in turn (usual approach)

B. All BU+CR appraisal team members at one location
   - Remote-only interview connections to the other 2 sites

C. One appraisal mini-team (BU+CR) at each of 3 sites
   - each site mini-team = home BU person + 1 CR person

D. Hybrid – BU appraisal team members @ their home site, CR appraisal team members at 1 site

How do these 4 options stack up against the 4 criteria?
## Analysis of appraisal team interviewing alternatives:

<table>
<thead>
<tr>
<th>Options:</th>
<th>A-Full team travels to all 3 sites</th>
<th>B-Full team @ 1 site</th>
<th>C-BU+CR mini-team per site</th>
<th>D-1 BU per site, all CR @ 1 site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Time and travel costs</td>
<td>(default)</td>
<td>☺ ☺☺ ☺☺☺</td>
<td>☺ ☺☺</td>
<td>☺ ☺☺ ☺☺☺</td>
</tr>
<tr>
<td>2-Interviewing effectiveness</td>
<td>(default)</td>
<td>☹ ☹ ☹</td>
<td>☹</td>
<td>☹ ☹ ☹</td>
</tr>
<tr>
<td>3-Mentoring of BU by CR</td>
<td>(default)</td>
<td>S</td>
<td>☺</td>
<td>☹ ☹</td>
</tr>
<tr>
<td>4-Findings generation</td>
<td>(default)</td>
<td>S</td>
<td>☹ ☹</td>
<td>☹</td>
</tr>
</tbody>
</table>

Key: S=Same, ☺ = better, ☹ = worse (vs. default)

Based on Pugh Concept Selection technique (QFD/Six Sigma)
Interview Logistics – 4

How could we further strengthen option C?

- Seek out approaches to maximize mixed/remote interview effectiveness
  - Technology – videoconferencing/webcams?
  - Most experienced onsite team member leads local interviews

- Find other ways to mitigate interview accuracy risks
  - More thorough advance document review (can do remotely!)
  - Conduct additional phone interviews if needed

- Re-unite the appraisal team for findings generation, after interviews and tagging are completed locally
  - Feasible since no on-site findings presentation was planned

- Reduce travel further if BU3 ‘flies solo’

TSP-like ‘Site Coordination Guide’ created by CR to help manage these complicated arrangements.
Appraisal Plan: Interview Sessions

Criteria for scheduling across time zones:

- Avoid sessions outside normal site work hours; minimize sessions over lunchtime
- Minimize total appraisal day length for the team
- Avoid conflicts with existing meetings at all 3 sites
- For small functional groups, combine participants from multiple sites into a single FAR
- One interview session per person, whenever possible
  - Many people wear multiple hats or work on cross-site projects
- Separate people with reporting relationships
  - complicated by the BU-wide and global matrix structure
Appraisal Plan: Interview Travel

Option C+ (1 BU+CR mini-team per site during interviews):

Interview scheduling for FARs had to accommodate time zone differentials.
Findings generation (after interviews) with Option C+:

Only CR2 needed to travel!
Appraisal Plan: Rating Scales – 1

Three sites with partially overlapping processes; desire for a single set of unified findings

What if one site was doing something well (green) but another was not (yellow or red)?

Our tailored ratings scale interpretations:

<table>
<thead>
<tr>
<th>Rating Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>All three sites are green</td>
</tr>
<tr>
<td>Purple</td>
<td>All three sites are purple (or 1-2 green)</td>
</tr>
<tr>
<td>Red</td>
<td>All three sites are red</td>
</tr>
<tr>
<td>Yellow</td>
<td>otherwise</td>
</tr>
</tbody>
</table>

Team agreed that Blue (not applicable) would not be allowed for SAM.
How could we characterize our confidence in the accuracy of a finding for the whole organization?

- e.g. high confidence about 1 site, less about others

Our tailored accuracy scale interpretations:

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High confidence for all 3 sites</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium or High confidence for all 3 sites</td>
</tr>
<tr>
<td>None</td>
<td>No observations captured for any site</td>
</tr>
<tr>
<td>Low</td>
<td>otherwise</td>
</tr>
</tbody>
</table>
Appraisal Execution: Benefits

- No travel for BU (and CR1) was much appreciated
  - Significantly reduced scheduling difficulties and total demand for BU time away from regular duties
  - Reduction of on-the-road time for CR2 was also welcome
  - Interviews were completed Monday-Wednesday, with ½ day of remote interviews the prior Friday

- Rotating interview lead to on-site CR person helped
  - Requires multiple ‘appraisal lead’-capable team members

- One-on-one BU mentorship in mini-teams worked well

- Partially-remote findings generation worked well enough for this appraisal
  - *but probably not well enough for a Class A?*
Appraisal Execution: Challenges – 1

- **Surprise:** Discovered more staff turnover since prior appraisals than we had expected
  - A few interviewees asking “what is CMMI” after receiving FAR session schedule notices
  - Pockets of CMMI un-awareness during interviews

*Contingency:*
- Quickly prepare/provide advance info on CMMI

- **Surprise:** Participants in prior appraisals were actually disappointed to not get questionnaires
  - Surfaced during interview ‘Golden Questions’

- Site Coordination Guide and Plan useful but did not ‘survive first contact’; both had to evolve
Appraisal Execution: Challenges – 2

*Logistics at site 3 broke down somewhat …*

**Surprise:** BU3 became unavailable for local interviews

- *Discovered half a week before the appraisal*
- No one else in BU had appraisal team experience
- CR3 was no longer available to travel that week

**Contingency:**

- All interviews at site 3 would now be fully remote
- Alternate EPG member assigned to site 3 logistics

**Surprise:** Short-notice all-hands meeting with overseas VIP disrupted appraisal schedule

- *Discovered the day before his visit to site*

**Contingency:**

- Quick reshuffling of scheduled interviews; had to go outside normal work hours
Appraisal Execution: Challenges – 3

- **Technical difficulties**
  - Some webcam software conflicted with standard internal screen-sharing software
  - Newer webcams could not connect from appraisal team rooms through corporate firewall
  - One laptop not enough for lead appraiser use

- **Remote interviewing weaknesses surfaced**
  - Harder for interview leads to manage dominant respondents in fully/partially remote sessions
    - Exacerbated when BUx not present due to reporting conflicts
  - Comprehension difficulties for remote note-takers
    - What: teleconferencing sound quality weak at times
    - Who: lack of visual cues on who was responding
# Appraisal Outcome – 1

## Practice Rating Counts for Maturity Level 2 PA’s

<table>
<thead>
<tr>
<th>ReqM</th>
<th>PP</th>
<th>PMC</th>
<th>MA</th>
<th>SAM</th>
<th>PPQA</th>
<th>CM</th>
<th>Meaning</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Practice is being implemented by all sites of the organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purple</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Organization (all sites) is largely implementing the requirements of the practice.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>6</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Organization is partially implementing the practice or is not consistently performing the practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Organization is not implementing the practice or its implementation is ineffective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No observation made</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Status | 15 | 24 | 20 | 18 | 18 | 14 | 17 |
## Appraisal Outcome – 2

### Generic Practice Ratings for Generic Goal 2

<table>
<thead>
<tr>
<th>ReqM</th>
<th>PP</th>
<th>PMC</th>
<th>MA</th>
<th>SAM</th>
<th>PPQA</th>
<th>CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP 2.2</td>
<td>Low-R</td>
<td>Low-R</td>
<td>Low-G</td>
<td>Low-P</td>
<td>Low-Y</td>
<td>Med-Y</td>
</tr>
<tr>
<td>GP 2.3</td>
<td>Low-P</td>
<td>Low-P</td>
<td>Low-G</td>
<td>Med-Y</td>
<td>Low-Y</td>
<td>Med-R</td>
</tr>
<tr>
<td>GP 2.4</td>
<td>Low-P</td>
<td>Med-G</td>
<td>Low-G</td>
<td>Low-P</td>
<td>Med-Y</td>
<td>Low-Y</td>
</tr>
<tr>
<td>GP 2.5</td>
<td>Low-Y</td>
<td>Med-P</td>
<td>Med-P</td>
<td>Med-G</td>
<td>Med-P</td>
<td>Low-P</td>
</tr>
<tr>
<td>GP 2.6</td>
<td>Low-G</td>
<td>Low-P</td>
<td>Med-P</td>
<td>Med-P</td>
<td>Med-Y</td>
<td>Low-Y</td>
</tr>
<tr>
<td>GP 2.7</td>
<td>Low-P</td>
<td>Low-P</td>
<td>Low-Y</td>
<td>Med-P</td>
<td>Med-P</td>
<td>Med-Y</td>
</tr>
<tr>
<td>GP 2.8</td>
<td>Low-R</td>
<td>Low-Y</td>
<td>Low-Y</td>
<td>Med-P</td>
<td>Med-Y</td>
<td>Low-Y</td>
</tr>
<tr>
<td>GP 2.10</td>
<td>Low-R</td>
<td>Low-Y</td>
<td>Low-Y</td>
<td>Low-Y</td>
<td>Low-R</td>
<td>Low-Y</td>
</tr>
</tbody>
</table>

**Observation Confidence Level Summary:** (126 ratings)

- High Confidence (all 3 sites) – none
- Medium Confidence – 66 (52.4%)
- Low Confidence – 59 (46.8%)
- No Confidence (no observations at any site; W) – 1 (0.8%)
Key Lessons Learned

**Interview Effectiveness and Efficiency**
- REQUIRE an experienced appraisal team member to be physically present at EACH site with interviewees
  - *if not possible, reschedule the appraisal*
- Restore use of advance questionnaires
  - *in addition to, or lieu of, ‘Golden Questions’*

**Logistics Improvements**
- Have two computers in each interview room, not one
  - screen sharing, projection of question slides, webcams, and note-taking
- Find/arrange a better way to get visual feedback during future remote/distributed interviews
  - and do a dry run *in* the actual interview rooms to be used!
- Site Coordination Guide valuable; enhance it
Would we do a distributed appraisal again?

Yes:
- Reduced ‘cost’ to BU significantly
- Delivered good-enough results for our needs

But:
- Adjustments needed to reflect lessons learned
- Class B/C only; benefits probably not worth the risks for a Class A
Questions?

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