The Business Benefits of CMMI at NCR Self Service

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Agenda

- Context: NCR Self Service, Scotland
- Process Improvement Journey
- Benefits gained in Software Process Improvement
- Challenges in changing culture
- Benefits gained using CMMI
- Reasons for success
- Issues faced
- Questions and Answers
NCR

Financial

Retail

Teradata

NCR ~ 30,000 Employees World Wide

Self-Service

Store Automation

Data Warehousing
Self Service: Global Presence and Customer Focus

- More than 500,000 Installed NCR ATMs
- 32% share of Installed base
- Shipments to 130 countries
- Manufacturing: Scotland-Canada-China, India-Brazil
- Global professional services
- Global customer services

Hardware  Software  NCR Services
Self Service in Scotland

Main Campus - Dundee

~ 1300 Employees

~ 500 in R&D

40 Project Managers

~ 90 active projects (Duration 2 months to 18 months)
Self Service Process Improvement Journey

1998 1999 2000 2001 2002 2003 2004

CMM Level 1 rating
CMM Level 2 rating
CMM Level 3 rating
CMMI Level 2 rating
CMMI Level 2 rating
CMMI Level 3 target

Software Process Improvement using S/W CMM
(Scope Software Development)

Process Improvement using CMMI
(Scope All Development and Product Management)

Mini Assessment

NCR Confidential
Self Service Process Improvement Journey

Software Process Improvement using Software CMM
(Scope Software Development)

△ Mini Assessment

Process Improvement using CMMI
(Scope All Development and Product Management)
Benefits Gained by Software Process Improvement
# CMMI and Predictability

<table>
<thead>
<tr>
<th>Level</th>
<th>Characteristic</th>
<th>Predicted Performance</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Optimizing</td>
<td>Continuous process improvement</td>
<td><img src="image" alt="Graph of Level 5" /></td>
</tr>
<tr>
<td>4</td>
<td>Quantitatively Managed</td>
<td>Process measured and controlled</td>
<td><img src="image" alt="Graph of Level 4" /></td>
</tr>
<tr>
<td>3</td>
<td>Defined</td>
<td>Process characterized for the organization and is proactive</td>
<td><img src="image" alt="Graph of Level 3" /></td>
</tr>
<tr>
<td>2</td>
<td>Managed</td>
<td>Process characterized for projects and is often reactive</td>
<td><img src="image" alt="Graph of Level 2" /></td>
</tr>
<tr>
<td>1</td>
<td>Initial</td>
<td>Process unpredictable, poorly controlled, reactive</td>
<td><img src="image" alt="Graph of Level 1" /></td>
</tr>
</tbody>
</table>

- **Productivity & Quality**
Software Schedule Variance Level 1 to 2

CMM Level 1
0% of projects were within +/- 25%
85% of projects were > 75% late

CMM Level 2
60% of projects were within +/- 25%
75% of projects were < 75% late
Software Schedule Variance
CMM Level 2 to 3

ATC Variance - Before & After - Original Baseline

<table>
<thead>
<tr>
<th>Delta Days</th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigma</td>
<td>1.44</td>
<td>2.30</td>
</tr>
<tr>
<td>Average</td>
<td>44.00</td>
<td>18.47</td>
</tr>
</tbody>
</table>

Average: 44.00
Sigma: 1.44
UCL: 149.19
LCL: 56.15

Before: -61.19
After: -19.21
Software Development Cycle Time

Year of Delivery

Weeks
Other Benefits

- Greater visibility of project status to senior management
- Expectation that schedule will be met
- Managed process now the foundation for continuous process improvement based on measurement
- Improved employee satisfaction
- Engineering projects are now measured against realistic targets
- Improved understanding of risks associated with projects
Software CMM to CMMI

1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004
---|---|---|---|---|---|---
CMM Level 1 rating | CMM Level 2 rating | CMM Level 3 rating | CMMI Level 2 rating | CMMI Level 2 rating | CMMI Level 3 target

Software Process Improvement using S/W CMM
(Scope Software Development)

Process Improvement using CMMI
(Scope All Development and Product Management)

Mini Assessment
Changing culture

‘As was’ situation 2001 in Engineering
- Reactive
- Process Averse
- Wide ranges of practices
- Limited lessons learned
- Ad hoc decision making

- ‘Finger in the air’ estimation
- Process owners in name only
- Only a few involved in Process Improvement
- Unpredictable processes

Target culture
- Proactive
- Process Discipline
- Consistent practices
- Lessons Learned every time
- Structured and fact based decision making

- Data driven estimation
- Active Process Management
- Majority involved in Process Improvement
- Predictable processes
Challenges of changing culture -1

**Starting point - ‘As was’ situation 2001**

- Compressed time frame “reach Level 3 in 2 years”
- Lack of Project Management discipline in Hardware Development
  - large overruns
  - poor visibility of portfolio status
  - inconstant process usage
  - Issue Management style - reactive
  - Risk Management almost non existent
- Short term ROI required for a medium to long term type investment

**However we were able to build on….**

- S/W team achieved Software CMM Level 3 in June 2001
- Most Project Managers had gained Masters Certificate in Project Management
- Strong Engineering Discipline
- Project Management Office started 2001
- 6 Sigma program underway in NCR
Challenges of changing culture -2

- Convincing the management team to invest the effort
  - The business case for change was built on previous success in using Software CMM locally and in other parts of NCR

- Getting peoples time to work on improvement when they are too busy fire fighting
  - Actively involved Senior Management
  - Project Management Office dual role of helping projects out of crisis and organisational improvement
  - Trained Project Managers in CMMI and sought their involvement in planning and action teams
  - Teams lead by experienced “change agents” involving the practitioners at required stages.
    - to understand the issues
    - come up with solutions
    - validate solution / working practices & pilot new practices
Challenges of changing culture - 3

● Getting people to execute a process for the first time
  √ Training, facilitation and support
  √ Using ‘evangelists’ to promote good practice
  √ Templates and guidance
  √ Communication and reminders
  √ Planned Assessments helped to provide additional motivation
  √ Project Management Certification Programme

● Achieving Institutionalisation
  √ Process Measures and Management Review with senior management
  √ Setting targets and reporting against them regularly
  √ Process Audits and assessments
Challenges of changing culture - 4

- Keeping the momentum going
  - √ Communication - emails, cascaded presentations, community events, easy to access
  - √ Process, templates and guidelines through web
  - √ Regular Lessons Learned forums
  - √ Rewards for good process improvement suggestions
  - √ Appraisals, focus the attention
Some Results to date

Development Variance Improvement

Period Project Planned

Average Days Variance from Plan

< 2000
2000 H1
2000 H2
2001 H1
2001 H2
2002 H1
2002 H2
2003 H1
2003 H2
Project Cycle Time Improvement

Development Project Cycle Time Reduction

% of average pre 2000 cycle time

<table>
<thead>
<tr>
<th>Period Project Planned</th>
<th>Module Integration Projects</th>
<th>Module/Device Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2000</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2000 H1</td>
<td>68%</td>
<td>95%</td>
</tr>
<tr>
<td>2000 H2</td>
<td>84%</td>
<td>49%</td>
</tr>
<tr>
<td>2001 H1</td>
<td>71%</td>
<td>60%</td>
</tr>
<tr>
<td>2001 H2</td>
<td>62%</td>
<td>51%</td>
</tr>
<tr>
<td>2002 H1</td>
<td>57%</td>
<td>95%</td>
</tr>
<tr>
<td>2002 H2</td>
<td>61%</td>
<td>51%</td>
</tr>
<tr>
<td>2003 H1</td>
<td>60%</td>
<td>47%</td>
</tr>
<tr>
<td>2003 H2</td>
<td>55%</td>
<td>34%</td>
</tr>
</tbody>
</table>
Other Benefits

√ Broader scope of SEI CMMI vs. Software CMM
   → From Requirements elicitation to final validation
√ Common language, templates and practices across disciplines
√ Sufficient consistency process in process execution to enable measurement and process improvement
√ Improved rigour in Project Management
√ Project Managers now thinking about ways to improve their processes
√ Better understanding of impact of changes
√ Improved usage of lessons learned
√ Formal project governance structure with more consistent management control and insight into status
Reasons for success - 1

- Senior management buy in and active involvement
- Project Managers saw CMMI practices helping them
- Measurements closely tied to business objectives with regular feedback on progress
  - Schedule variance and project cycle time
  - Some schedule variance and cycle time gains in the first year - helped to keep management attention
  - Not just about getting the level rating
- Running the improvement effort as a year-to-year project
  - Planned, tracked and leading by example
  - Regular Improvement Team meeting
- Process user involvement in defining changes and pilots
- Focus on use of a few templates with built in guidance
Reasons for success - 2

- Dedicated resources on the improvement
- Project Management Office direct involvement
  - Parallel focus on Project Management Competency development
  - 1 to 1 Project Consultancy
  - Active Process Management
- Prior work carried out by Software Improvement Team
- Prior Project Management Training
- CMMI Training for Project Managers and Quality Assurance
- Regular short process training sessions, ~27 hours per person
- Regular Communication of what’s happening (newsletter, emails, management communication sessions, web site, project manager community events etc)
- Appraisals focused the attention for implementing improvements
  - Had internal qualified CMMI Appraiser
Issues (1)

- Coping with the level of change required in a short space of time
  - Time to keep up with the changes and Business Pressures
    √ Careful planning and co-ordination of improvement efforts required
- Benefits take time to become visible to management
  - With a project cycle time of 6 - 9 months new practices typically only get adopted as new projects start
    √ Need to introduce change midstream into projects to speed up change
- Senior Management behavior
  - Ignoring process sometimes seen as a badge of honor
    √ Need to use tailoring as a controlled way of adapting process
Issues (2)

- Lip service sometimes paid to the process
  - Typically due to a lack of understanding of the importance or usefulness of the practice
  - Learning from peers is often useful here (e.g. Lessons Learned forum)

- Over complex measurement systems
  - Too many or too complex measures can be counterproductive
  - Focus on ones that address the key business objectives

- Tools are often used as an excuse
  - “Tools are non-existent, slow or don’t automate everything for me”
  - New Tools seldom provide the silver bullet
  - Need to integrate tools with the process
Conclusion

● Achieving CMM/CMMI Level 2 and 3 has led to improved business performance within NCR Self Service

● CMMI Level 3 provides the foundation for Continuous Process Improvement based on measurement within NCR Self Service
  – Repeatable set of processes in place

● Success requires 3 key elements
  √ Building and selling the business case for change (ROI)
  √ Senior Management regular and direct involvement
  √ Some dedicated resource
For more information

- CMMI - Free download of the model, papers and reports
  www.sei.cmu.edu/cmmi/

- NCR
  www.ncr.com