Workforce Issues of the 21st Century: The People CMM to the Rescue

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Software Engineering Institute

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Agenda

1. Workforce Issues of the 21st Century
2. Workforce Issues Impacting Performance and Retention
3. Overview of the People CMM
Workforce Issues of the 21st Century
Putting People Back Into the Equation

Today, organizations are largely dependent on high-technology to develop, build, and maintain their products and services.

This has created a dependence on a workforce with specialized knowledge and skills.
People: Growing Contributors to Organization Success

Organizational Value: Tangible and Intangible

Source: Kirchoff 2006
Workforce Issues: Worldwide Trends

Shifting Demographics
United States, European Union, Japan…

Shortage of knowledgeable, skilled, and adaptable workforce
United States, European Union, Mexico, South Africa, China…

Work-life balance
United States, European Union, China

Retention
United States, European Union, China, India

Multiple generations in the workforce
United States, European Union, China
Trends Affecting the Workforce
Shifting Demographics of the World’s Population

“One in every three of Lockheed’s employees is over 50, to sustain our talent base, we’re hiring 14,000 people a year. In two years, we’re going to need 29,000 new hires; in three years, 44,000. If this trend continues, over the next decade we will need 142,000.” Robert J. Stevens, Chairman, President and CEO Lockheed Martin, Wall Street Journal April 19, 2006.

Trends Affecting the Workforce
Shifting Demographics of the World’s Population

US Computer Sciences Degrees Awarded 1999 - 2005

Source: National Science Foundation Statistics May 2008

“one job in every 19 created in the US over the course of the next decade will be in technology.”
Business Week June 30, 2008
Shift in Demographics: US Baby Boomers

In the US, between 2010 and 2030 over 78 million baby-boomers, many in key positions, will be eligible for retirement. With the exit of a large segment of the workforce, many organizations may be facing a loss of:

**Senior Management**
- corporate knowledge (“know-how”, soft knowledge, etc.)
- customer and product/services intimacy
- technical knowledge and skills
- mentor

**Senior Technical Staff**
- technical knowledge and skills
- product and/or service development knowledge
- corporate knowledge (“know-how”, soft knowledge, etc.)
- mentor

**Senior Administrative Staff**
- corporate knowledge (“know-how”, soft knowledge, etc.)
- mentor

and a shift or change in: **Corporate Culture**
**National, DoD, and Civilian AT&L Workforce**

“DoD faces significant challenges related to mitigating the pending departure of its highly experienced and seasoned talent – the critical challenge” Frank Anderson, Jr., Director, AT&L Human Capital Initiatives, President, Defense Acquisition University 2007

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<tbody>
<tr>
<td></td>
<td>Workforce (Millions)</td>
<td>% Workforce</td>
<td>Workforce</td>
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<tr>
<td>Traditionalists (Born before 1946)</td>
<td>11.5</td>
<td>7.5%</td>
<td>45,625</td>
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<td>Baby Boomers (1946 - 1964)</td>
<td>61.5</td>
<td>42.0%</td>
<td>438,971</td>
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<td>Generation X (1965-1976)</td>
<td>43.5</td>
<td>29.5%</td>
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<td>Generation Y (1977 -1989)</td>
<td>31.5</td>
<td>21.0%</td>
<td>62,676</td>
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<td>Millennium (1990 - present)</td>
<td>51.0</td>
<td>0%</td>
<td>153</td>
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Source: Anderson 2007, NDIA STEM Initiative Strategy Session
Focus on the Software Developer: Age Distribution

U.S. Commercial

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<thead>
<tr>
<th>Age in Years</th>
<th>Programmer</th>
<th>Software Engineer</th>
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<tbody>
<tr>
<td>65 to 74</td>
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<td>55 to 64</td>
<td>5%</td>
<td>15%</td>
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<tr>
<td>45 to 54</td>
<td>15%</td>
<td>20%</td>
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<td>35 to 44</td>
<td>25%</td>
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<tr>
<td>25 to 34</td>
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<tr>
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U.S. Government

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Workforce Issues: What Does This Mean to You?

Shortage of workers can place undue pressure on existing workforce, longer hours, etc.,

- reduces productivity and increases defects
- reduces morale and organizational loyalty

Knowledge and skills gap

- college graduates
- need to establish or invest in training and development activities
- need to invest in knowledge and skill profiles and assess current capability (competencies)

Place a strain on Human Resources, hiring managers, and/or recruiters

- competition for experienced/skilled managers
- intense competition for skilled and knowledgeable workforce
- Federal Sector: Clearance, Clearance, Clearance
Managing Multiple Generations: Cultural Differences

Traditionalist
1928-1945
- Hard worker
- Respects authority
- Work is an obligation
- Communicates formally & in person
- Organizational loyalty
- Work & family don’t mix

Baby-Boomer
1946 - 1964
- Workaholic
- Questions authority
- Works efficiently
- Competitive
- No news is good news
- Work to live, little balance between work/family

Generation X
1965 - 1980
- Technically savvy
- Prefer informality
- Learns quickly
- Communicates directly & immediately
- Wants structure & direction
- Seek work/life balance

Generation Y
1980 - 2000
- Prefer informality
- Learn quickly
- Embrace diversity
- Requires supervision
- Indirect communication: email & texting
- Seek “demand” work/life balance

Source: Hammill 2005
Workforce Issues Impacting Performance and Retention
Workforce Issues: Performance & Retention

Managers

- limited skills/abilities to manage and develop people

Staffing

- hired for a job without the required knowledge and skills
- job hired is different than job assigned

Training and Development

- training is not keeping up with changes in technology
- training to reduce knowledge and skills gaps is not provided, timely, or relevant
- limited/no opportunities to develop and use new knowledge and skills (growth)

Performance Management

- no clear performance objectives, no linkage to committed work
- performance problems are not managed
- inconsistent rewarding of performance
Workforce Issues: Performance & Retention

Communication

- limited/no communication, top down, bottom up, and laterally
- inconsistent and vague messages (verbal and behavioral)

Compensation

- not linked to performance objectives
- rewards for inappropriate behaviors
- inequity issues

Work Environment

- physical space and resources to perform committed work are not provided or not provided in a timely manner

Organizational Culture

- gap between Ideal and Real Culture
- culture does not support business objectives or mission goals
Misaligned Workforce Practices
The People Capability Maturity Model: Overview
People CMM: Introduction

The People CMM is a roadmap for implementing workforce practices that continuously improve the capability of an organization’s workforce. It enables organizations to:

- to attract, develop, organize, motivate, and retain the workforce required to build their products and deliver the services
- align workforce development with strategic business or mission goals
- characterize maturity of workforce practices
- set priorities for improving workforce capability
- become an employer of choice

Curtis, Hefley, & Miller (2001)
People CMM Model Components

Process Area

Implementation Goals

Institutionalization Goal

Key: Required Expected Informativ

Adapted from CMMI v1.2 Figure 2.1
## People CMM: Process Areas by Maturity Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Focus</th>
<th>Process Area</th>
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<tbody>
<tr>
<td>5</td>
<td>Continuous Improvement</td>
<td>Continuous Workforce Innovation, Organizational Performance Alignment, Continuous Capability Improvement</td>
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<tr>
<td>4</td>
<td>Predicting Capability &amp; Performance</td>
<td>Mentoring, Organizational Capability Management, Quantitative Performance Management, Competency-Based Assets, Empowered Workgroups, Competency Integration</td>
</tr>
<tr>
<td>3</td>
<td>Organizational Competency framework</td>
<td>Participatory Culture, Workgroup Development, Competency-Based Practices, Career Development, Competency Development, Workforce Planning, Competency Analysis</td>
</tr>
<tr>
<td>1</td>
<td>Initial</td>
<td></td>
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</table>
People CMM Practices: “What, not How”

Practices describe “what” activities and actions should be performed. It is up to the organization to decide “how” the practices are implemented to satisfy goals.

“How” Factors
Organizational Culture
Industry
Country

Two Types of Practices: “The What”

Implementation
Describe the activities or procedures that should be performed by individuals, in workgroups or units, or by the organization.

Institutionalization
Practices that help to institutionalize the implementation practices in the organization’s culture so they are effective, repeatable, and lasting.
People CMM: Institutionalization Practices

Practice performance will decay if not institutionalized

- **If no commitment**: Failed efforts
- **If no ability**: Ineffective performance
- **If no measurement**: No improvement
- **If no verification**: Declining compliance
People Capability Maturity Model: Primary Objective

The primary objective of:

- a CMM is to improve the capability of an organization.
- the CMMI (DEV, ACQ, SVS), is to improve the capability of an organization’s processes.
- the People CMM is to improve the capability of an organization’s workforce.

The People CMM, defines capability as the level of knowledge, skills, and process abilities available within each workforce competency of the organization to build its products or deliver its services.
Defining Workforce Competency

Knowledge represents the comprehension acquired by experience and or study.

Skills represents the proficiency or ability in techniques or tools that an individual must be able to demonstrate.

Process abilities is the capacity to perform individual skills in the sequencing or method used in the organization.

Knowledge + Skills + Process abilities = Workforce Competency
## Workforce Competency Example: Software Engineering

### Competency Family
- **Software Engineering**

#### Software Engineer I
- **Application domain:** Procedural design
- **Knowledge:** Requirements analysis, System design, Project management, debugging
- **Skills:** Requirements analysis, System design, Project management, debugging
- **Process Abilities:** Integrated team design, Fagan inspections, Test procedures, Change control

#### Software Engineer II
- **Application domain:** Procedural design
- **Knowledge:** Requirements analysis, System design, Project management, debugging
- **Skills:** Requirements analysis, System design, Project management, debugging
- **Process Abilities:** Integrated team design, Fagan inspections, Test procedures, Change control

#### Software Engineer III
- **Application domain:** Procedural design
- **Knowledge:** Requirements analysis, System design, Project management, debugging
- **Skills:** Requirements analysis, System design, Project management, debugging
- **Process Abilities:** Integrated team design, Fagan inspections, Test procedures, Change control

#### Software Engineer IV
- **Application domain:** Procedural design
- **Knowledge:** Requirements analysis, System design, Project management, debugging
- **Skills:** Requirements analysis, System design, Project management, debugging
- **Process Abilities:** Integrated team design, Fagan inspections, Test procedures, Change control

### Current Resource Profile (initial inventory)

<table>
<thead>
<tr>
<th>Workforce Competency</th>
<th>Staffing by Capability Level</th>
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<tbody>
<tr>
<td></td>
<td>I</td>
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<tr>
<td>Software Engineer</td>
<td>17</td>
</tr>
<tr>
<td>User Training</td>
<td>2</td>
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### Current Workforce Needs (one year cycle)

<table>
<thead>
<tr>
<th>Workforce Competency</th>
<th>Current Staffing Level Needed</th>
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<tr>
<td></td>
<td>I</td>
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<tr>
<td>Software Engineer</td>
<td>23</td>
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### Strategic Workforce Needs (two to five year)

<table>
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<th>Workforce Competency</th>
<th>2010 Staffing Level Needed</th>
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<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Software Engineer</td>
<td>31</td>
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<td>User Training</td>
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From Counting Heads to Understanding Capability

10 Software Engineers
5 System Engineers
4 Business Analysts

Resource Profile

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People CMM: Focus for Changing Practices

Maturity Levels

1. Ad hoc, Inconsistent workforce practices
2. Managers perform repeatable practices
3. Organization develops workforce competencies
4. Empowered workgroups & measured capability
5. Improvement & integration of personal work processes
Multiple Roles in the People CMM

While change might be initiated by a single source, it must be **accepted**, **internalized**, and **institutionalized** by all affected parties to become effective and lasting. Practices in the People CMM address this issue.
Organizational Culture: People CMM Transformations

Level 1: Chaotic and an impediment to lasting change

Level 2: Change occurs due to management and workforce buy-in of committed work

Level 3: Common understanding of culture; reflects professionalism and information sharing

Level 4: Supports results oriented performance and quality

Level 5: Adaptable to changes in business conditions
Multiple Models/Technologies Architectures

- Business Goals and Objectives
  - Integration and Interaction
  - Software and Systems
  - Knowledge and Skills
  - Infrastructure

- Product line architectures
- Organization & Management
- CMMI
- People CMM

- Lean Enterprise: Simplify and Standardize

Adapted from John Vu: SEPG 2006
Improvement Efforts: Missing Elements for Change

- Vision
- Resources
- Capable Workforce
- Capable Processes
- Organizational Culture
- Incentives
- Action Plan

Change
Confusion
Anxiety & frustration
Slow or little progress
Reinventing the wheel
Barriers to change
Sporadic change
False starts

Adapted from: Delorise Ambrose, 1987. Personal communication.
People CMM Courses

Introduction to People CMM

August 6 – 8, 2008, Washington DC
October 22 – 24, 2008 – Vancouver, Washington
(week prior to CMMI workshop)
November 2008 (date to be determined) Argentina
December 8 – 10, 2008 - Pittsburgh, PA

Intermediate Concepts of People CMM

September 8 - 12, 2008 – Frankfurt, Germany

SCAMPI with People CMM Lead Appraiser Training

November 3 – 7, 2008 – Pittsburgh, PA

SCAMPI with People CMM Upgrade Training

Week of October 27, 2008 – Vancouver, Washington
# Contacting the SEI

## Presenters

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## Contact Information

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<th><a href="mailto:pjb@sei.cmu.edu">pjb@sei.cmu.edu</a></th>
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Bibliography


