Process Improvement
“At the Edges”

SuZ Garcia
Software Engineering Institute/
Carnegie Mellon University
SuZ Garcia is a senior member of the technical staff of the Research, Technology, and Systems Solutions directorate of the SEI. Her current research primarily focuses on organizational issues related to participating in complex systems of systems efforts. Her background in developing and implementing multiple CMMs throughout her 15 years of association with the SEI supports her search for solutions to complex organizational problems in this new research area.

SuZ has been speaking and teaching all over the world about process improvement for almost 20 years, and has captured some of her favorite approaches to improvement in the 2006 book she co-authored with Richard Turner, *CMMI Survival Guide: Just Enough Process Improvement*. 
Why Talk about Improvement At the Edges?

*Much of the software-intensive systems economy is affected by these “edges”*

Small settings:
- In US, 41% of high technology jobs are held by small companies
- Even higher percentages outside the US

Multi-organizational:
- Some of our largest new “systems of systems” will play critical infrastructure roles in our near future (e.g. health information networks)

Multi-model:
- Many organizations are faced with mandates or market pressures to respond to more than one set of improvement models/techniques

The edges represent different environments in which we need to apply process improvement models, tools, and techniques.
Our Process Improvement Approaches Need to Account for Differences in Environment
The Process Challenges of a Small Business Owner...
...Are Different from a Manager in an Organization Participating in a Multi-Organizational Improvement Effort against Multiple Models...
...Or Are They?
Some (Surprising?) Similarities Between Small Settings and Systems of Systems Settings

- Lack of Access to “Right” Expertise When Needed
- The “Rules” Keep Changing
- Uncertainty in the ROI that can be expected
- There’s Never a Good Time to Start a New PI Effort
- The Improvement Activities are Similar, though their Scale Isn’t
- Responding to Different Market Demands for PI Strategies is Nerve Wracking
- Sustaining Sponsorship Over Time is Difficult
Some (Not so Surprising) Differences

<table>
<thead>
<tr>
<th>Small Settings</th>
<th>SoS Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often Lacking</td>
<td>Variable among Participants</td>
</tr>
<tr>
<td>Clear (one way or the other!)</td>
<td>Often unclear where sponsorship needs to be sought</td>
</tr>
<tr>
<td>High</td>
<td>Lower, though variable among participants</td>
</tr>
<tr>
<td>Low</td>
<td>Higher, though variable among participants</td>
</tr>
</tbody>
</table>

- **Business Infrastructure**: Often lacking in Small Settings, variable among Participants in SoS Settings.
- **Sponsorship**: Clear in Small Settings, often unclear in SoS Settings.
- **Appraisal/Defn Costs as % of PI costs**: High in Small Settings, lower in SoS Settings, though variable among participants.
- **Deployment Costs**: Low in Small Settings, higher in SoS Settings, though variable among participants.
Process Improvement Competencies That Support Either Context

- Establishing and Measuring Against Realistic Goals
- Establishing and Sustaining Process Improvement Infrastructure
- Defining and Describing Processes & Their Guidance
- Deploying New or Improved Processes
- Managing an appraisal Life Cycle
- Building and Sustaining Sponsorship

SEI Work to Support Process Improvement at the Edges

Small Settings:

- IPSS (Implementing Process in Small Settings) project within SEPM is developing a Field Guide to provide guidance on implementing the PI competencies
  - Prototype will be reviewed by subject matter experts this autumn
  - Eventually intended as a web-based resource accessible globally

Systems of Systems Settings:

- Interoperable Acquisition IRAD considered process issues as part of its scope (SEI TN: *Process Considerations in Interoperable Acquisition*)
- Exploratory research in interoperable process improvement starts this October with SEI Europe staff support

Multi-Model Settings:

- SEI Europe and SEPM staff developing PRIME, a method for approaching multi-model improvement efforts; likely to be some overlap between PRIME and interoperable process improvement work
So What Can You Do?
SuZ’ Advice for Now: Applying the PI Competencies in Small Settings (1)

• Take advantage of the fact that your sponsorship probably equals ownership!

• Don’t take for granted that because you’re small, communication will automatically happen; agree on communication approaches and frequency with your sponsor

• Make sure that your PI goals directly support your business’ goals. “Maturity Level 3” is rarely an appropriate PI goal!¹ Pick the model/framework that aligns most closely with your business problems as your starting point

• Collecting measures is often more difficult in small settings because basic business infrastructure like effort reporting systems are often missing. Try to find synergy between investments needed for PI progress measurement and other business needs.

¹See CMMi Survival Guide pp.135-136 for my soapbox on this topic!
SuZ’ Advice for Now: Applying the PI Competencies in Small Settings (2)

Don’t try to duplicate the infrastructure of the large organizations, but look for places where you can leverage elements of your business infrastructure for process improvement purposes.

Decide whether you need to plan your infrastructure around staying small, or growing fast – it makes a huge difference in how much PI infrastructure you need to invest in.

Keep it simple, both in content and representation! Processes in small settings should be simpler because of the small # of communication paths.

Leverage process guidance documentation’s ability to provide “backup” for critical people in your project/organization who are probably performing multiple roles.
SuZ’ Advice for Now: Applying the PI Competencies in Small Settings (3)

• Take advantage of the small # of people you have to deploy new processes/techniques to. If you leverage definition and deployment activities well, you can almost get “self-deploying” processes.

• Small settings often draw people who thrive on change – if this is the case, leverage that quality!

• “appraisal” here is not meant to imply CMMI-based appraisals – we just mean events that help you determine your progress in conforming to your chosen model/framework.

• If you look at this as a cycle, then you’re more likely to plan multiple interventions instead of just one; we all need progress measures to stay motivated when changing; so you’ll need multiple points where you perform these kinds of activities.
SuZ’ Advice for Now: Applying the PI Competencies in System of Systems Settings (1)

• Look across the organizations you know are participating for their local process improvement champions – they’re the ones who will know who needs to be a sponsor to get things done in their home organization.

• You probably won’t be able to find an “uber sponsor”; a Process Improvement Integrated Product Team is a more likely approach for sustaining sponsorship.

• This is an area where “common” terms are likely to be understood differently across organizational settings. Try to establish operational definitions wherever possible.

• Focus on goals related to individual processes that need to interoperate (e.g. your risk management processes), rather than “everyone should be Level x”.

Building and Sustaining Sponsorship

Establishing and Measuring Against Realistic Goals
SuZ’ Advice for Now: Applying the PI Competencies in System of Systems Settings (2)

- Establishing and Sustaining Process Improvement Infrastructure
  - One of the biggest challenges in SoS PI is the likely difference in PI infrastructures – from different asset library information architectures to different training approaches. Setting up a “project-only” PI infrastructure can work if you leverage project infrastructure that everyone already uses.
  - Don’t try to ‘enforce’ more commonality in infrastructure than is really needed; always ask “will this meet our goals?” If answer is yes, chances are you should allow the differences that are inevitable. If answer is no, figure out the minimum solution needed to meet the goals.

- Defining and Describing Processes & Their Guidance
  - Focus on the handful of processes that need to interoperate to sustain both the development and the operational teams. Keep representations simple.
  - Be ready to deal with home organizations that won’t grant tailorings or waivers to their internal processes in favor of your project’s process by providing things like mappings that show how the suggested process meets their goals.
SuZ’ Advice for Now: Applying the PI Competencies in System of Systems Settings (3)

Deploying New or Improved Processes

• One of the big challenges here is the asynchronous nature of people joining/leaving the SoS team. Make sure that your deployment approaches account for quickly bringing new participants up to speed efficiently.

• The heterogeneity of the cultures likely to be involved means that you’ll have to look at adoption risk issues within each individual organization, not just within the team.

Managing an appraisal Life Cycle

• An interoperable schedule monitoring process is probably at the top of your interoperating processes list; leverage it to help in planning and monitoring your appraisals/progress determination cycle(s)

• Take advantage of the diversity of participants in making up teams for appraisal and progress determination. This is a great opportunity for cross-organizational learning that can be complicated by proprietary issues, if you’re not careful.
To Stay Tuned to Progress in These Areas…

Improving Processes in Small Settings project:
• Website: [http://www.sei.cmu.edu/iprc/ipss.html](http://www.sei.cmu.edu/iprc/ipss.html)
• Project Leader: Mike Phillips, dmp@sei.cmu.edu

Interoperable Process Improvement exploration:
• Urs Andelfinger, ua@sei.cmu.edu
• SuZ Garcia, smg@sei.cmu.edu

Multi-Model Improvement Approaches exploration:
• PRIME: Pat Kirwan, pkirwan@sei.cmu.edu
• CMMI & Six Sigma: Bob Stoddard, rws@sei.cmu.edu; Jeannine Siviy, jmsiviy@sei.cmu.edu
You CAN Tame the Dragons and Expand the Known World of Process Improvement!!!
THANK YOU!