Using Organizational Baselining to Inform Adoption Planning of New Practices

Suzanne Miller, Principal Researcher

Bart Hackemack, Senior Member, Technical Staff

February 2020

Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213

Carnegie Mellon University
Software Engineering Institute

Document Markings

Copyright 2019 Carnegie Mellon University.

This material is based upon work funded and supported by the Department of Defense under Contract No. FA8702-15-D-0002 with Carnegie Mellon University for the operation of the Software Engineering Institute, a federally funded research and development center.

The view, opinions, and/or findings contained in this material are those of the author(s) and should not be construed as an official Government position, policy, or decision, unless designated by other documentation.

References herein to any specific commercial product, process, or service by trade name, trade mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by Carnegie Mellon University or its Software Engineering Institute.

NO WARRANTY. THIS CARNEGIE MELLON UNIVERSITY AND SOFTWARE ENGINEERING INSTITUTE MATERIAL IS FURNISHED ON AN "AS-IS" BASIS. CARNEGIE MELLON UNIVERSITY MAKES NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, AS TO ANY MATTER INCLUDING, BUT NOT LIMITED TO, WARRANTY OF FITNESS FOR PURPOSE OR MERCHANTABILITY, EXCLUSIVITY, OR RESULTS OBTAINED FROM USE OF THE MATERIAL. CARNEGIE MELLON UNIVERSITY DOES NOT MAKE ANY WARRANTY OF ANY KIND WITH RESPECT TO FREEDOM FROM PATENT, TRADEMARK, OR COPYRIGHT INFRINGEMENT.

[DISTRIBUTION STATEMENT A] This material has been approved for public release and unlimited distribution. Please see Copyright notice for non-US Government use and distribution.

This material may be reproduced in its entirety, without modification, and freely distributed in written or electronic form without requesting formal permission. Permission is required for any other use. Requests for permission should be directed to the Software Engineering Institute at permission@sei.cmu.edu.

DM19-1260

Installation vs Adoption

Installation

- Technology is installed, trained, and available for use

Adoption

- Installation plus technology is routinely used for its intended purpose

Which do we want? Which do we typically support?

What Do Leaders Want to Know about New Practice Adoption (like Agile)?

*Usually*--How many people have heard of it, been trained in it, tried it, used it?

- In adoption parlance, this is a question that is addressed by DIFFUSION measures

Not as often--How close are the new practices to being "routine" or status quo?

- In adoption parlance, this is a question that is addressed by INFUSION measures

Leaders who only look at the "how many" question mostly get indicators of INSTALLATION
Leaders who also look at the "how deep" question get better indicators of long-lasting ADOPTION
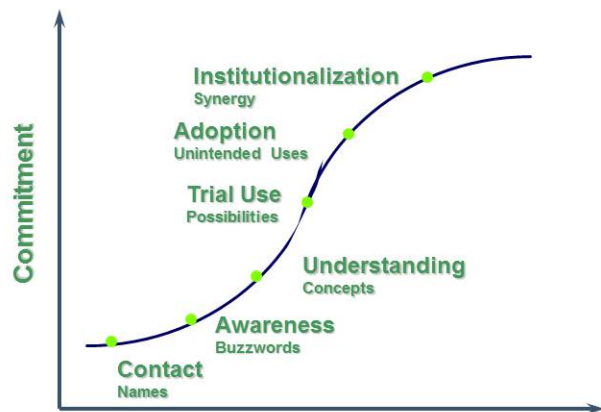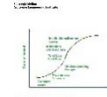
One approach is to ask "how many" have passed through the various stages of the Adoption Commitment Curve on their way to Institutionalization (strong routine)

Relatively easy for Contact—Understanding:

- Counting the number of people in classes, the number of clicks on the website etc not too difficult
- Measuring Trial Use is not too dififcult – how many have used new technology at least once
- Measuring "how many" for Adoption and Institutionalization is harder, because you're transitioning to asking about things related to Infusion, not Diffusion

Measuring Infusion: How Routine Has It Become?

Who
- What roles use the technology?
- How committed are the leaders in the roles committed to the technology?

When
- Is technology/practice used to make relevant decisions?
- Is the technology/practice used when inconvenient as well as when convenient?

The SMC State of Agile Report #1 – September 2019

Sponsored by SMC's Agile Readiness Center

A questionnaire-based report of SMC staff and their use and perceptions about Agile, Lean, and (a bit of) DevSecOps

Modelled after the Collabnet Annual Agile Survey with adaptations made for SMC context:

- Demographic information collected is relevant to the government context, not the commercial
  - Initial demographics indicate that some respondents are not the primary target of Agile adoption; the Spring 2020 version of the survey should correct the target population
- SEI noted that the Collabnet survey focused on Diffusion measures; SMC is also interested in Infusion
  - Additional questions were added to get to the question of "how routine has Agile become?"
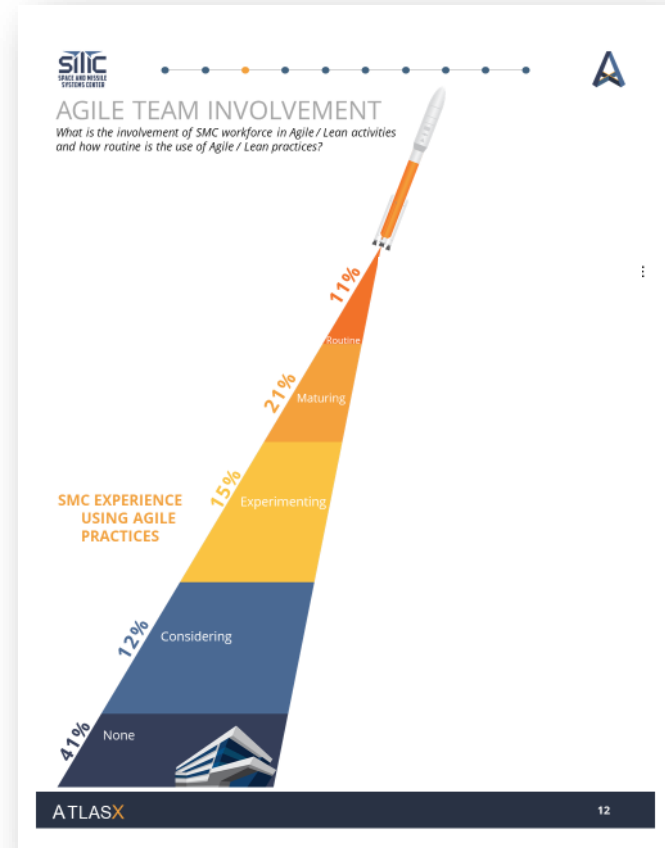
Things Included in the SMC SOA Questionnaire to Address Diffusion-1

SMC Experience Using Agile Practices

- None→Considering→Experimenting→ Maturing→Routine

Monitoring change to this measure in future will help to understand the pace of adoption throughout the enterprise

Diffusion-2

A different "how many" question – how many respondents have been involved in successful (from their perception) Agile programs—almost half of SMC respondents reported involvement with at least one successful Agile program

SUCCESSFUL AGILE PROGRAMS

47% ...of respondents have been involved in at least **1** *successful* Agile program

NUMBER OF AGILE PROGRAMS

48% ...of respondents have been involved in at least **1 Agile program**

Infusion is Often Overlooked in Questionnaires Seeking to Understand Agile Adoption

There are both direct and indirect indicators that new practices are becoming routine:

- Increased role of the practices or their foundational principles in decision making (direct)
- Increasing amount of time respondents have been practicing Agile (indirect)
- Willingness of respondents to modify the environment to accommodate Agile vs returning to former practices
- Perception of alignment between adoption goals and results achieved

Lack of understanding of infusion can lead to:

- False perception that adoption is successful because lots of people have been trained, lots of projects have been started
- Reduction of resources that are needed to ensure the practices become routine
- Coaching, an especially useful approach to improving infusion, is often shortchanged once initial training and initial Trial Use activities have been completed

Things Included in the SOA Questionnaire to Understand Infusion-1

SMC's State of Agile Questionnaire included several quantitative indicators of infusion

1) Agile's role in decisionmaking:

• No Part→Plays a Foundational Role

This question directly addresses the Infusion question and will provide a basis in future for understanding how quickly Agile and Lean practices move into a routine state
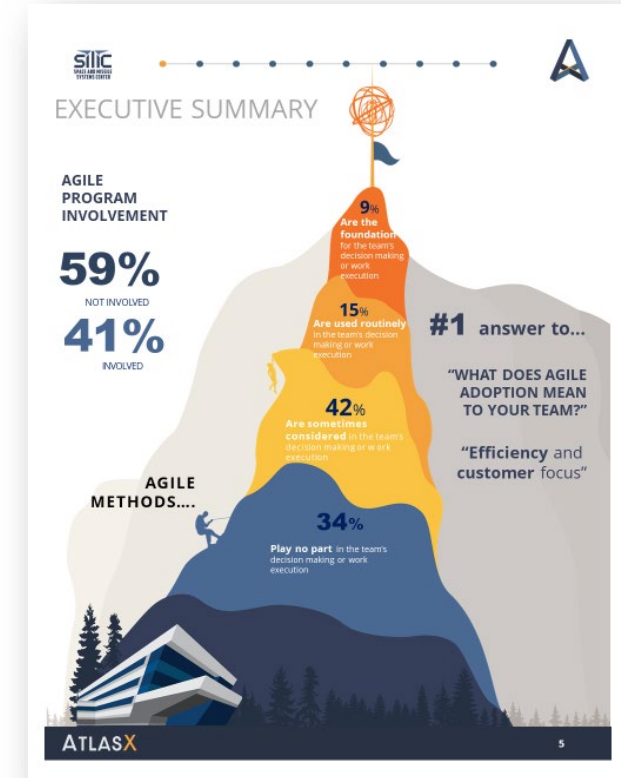
Infusion Measures-2

2) Another indirect indicator of routine use is the amount of time the respondent population has been using the practices-over 1/3 of the respondents have been using Agile practices 3 years or more

LENGTH OF TIME USING AGILE PRACTICES

<1 Year	34%
1- 2 Years	29%
3 -5 Years	23%
5+ Years	14%
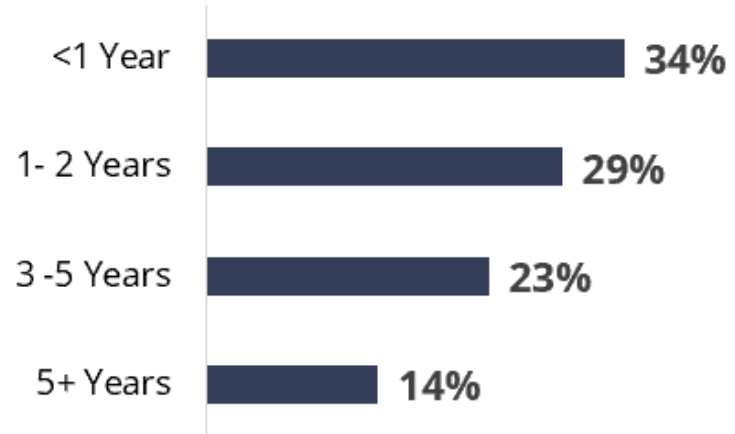
Infusion Measures-3

3) Artifact modification – modifying acquisition artifacts to accommodate Agile practices – is an indicator that the practices are starting to "stick"

- Rather than going back to traditional acquisition, some respondents are modifying the acquisition eco-system to accommodate Agile practices

ACQUISITION ARTIFACT MODIFICATION

For the respondents who changed acquisition artifacts to establish an Agile strategy, the breakdown of artifacts modified is as follows:

Artifact	Percentage
Statement of work	21%
Acquisition strategy	20%
Technical Review (PDR, CDR, etc) criteria	20%
Systems Engineering Plan	15%
Test & Evaluation Management Plan	13%
L&M (Evaluation criteria)	7%
Other	4%
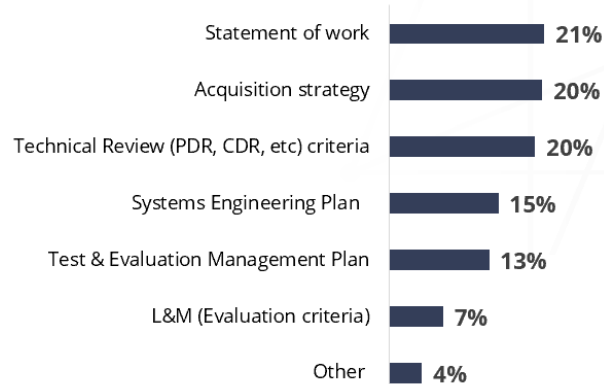
Infusion Measures-4

4) The result that the top 3 reasons for choosing Agile and the top 3 benefits cited for using Agile are the same is encouraging for the movement of Agile practices toward becoming routine:

- Alignment of results to goals is a reinforcing function for the new practices

REASONS FOR CHOOSING AGILE

Top three

| **Accelerate** value delivered

| Enhance ability to **manage** changing priorities

| **Increase** productivity

BENEFITS REALIZED USING AGILE

Top three

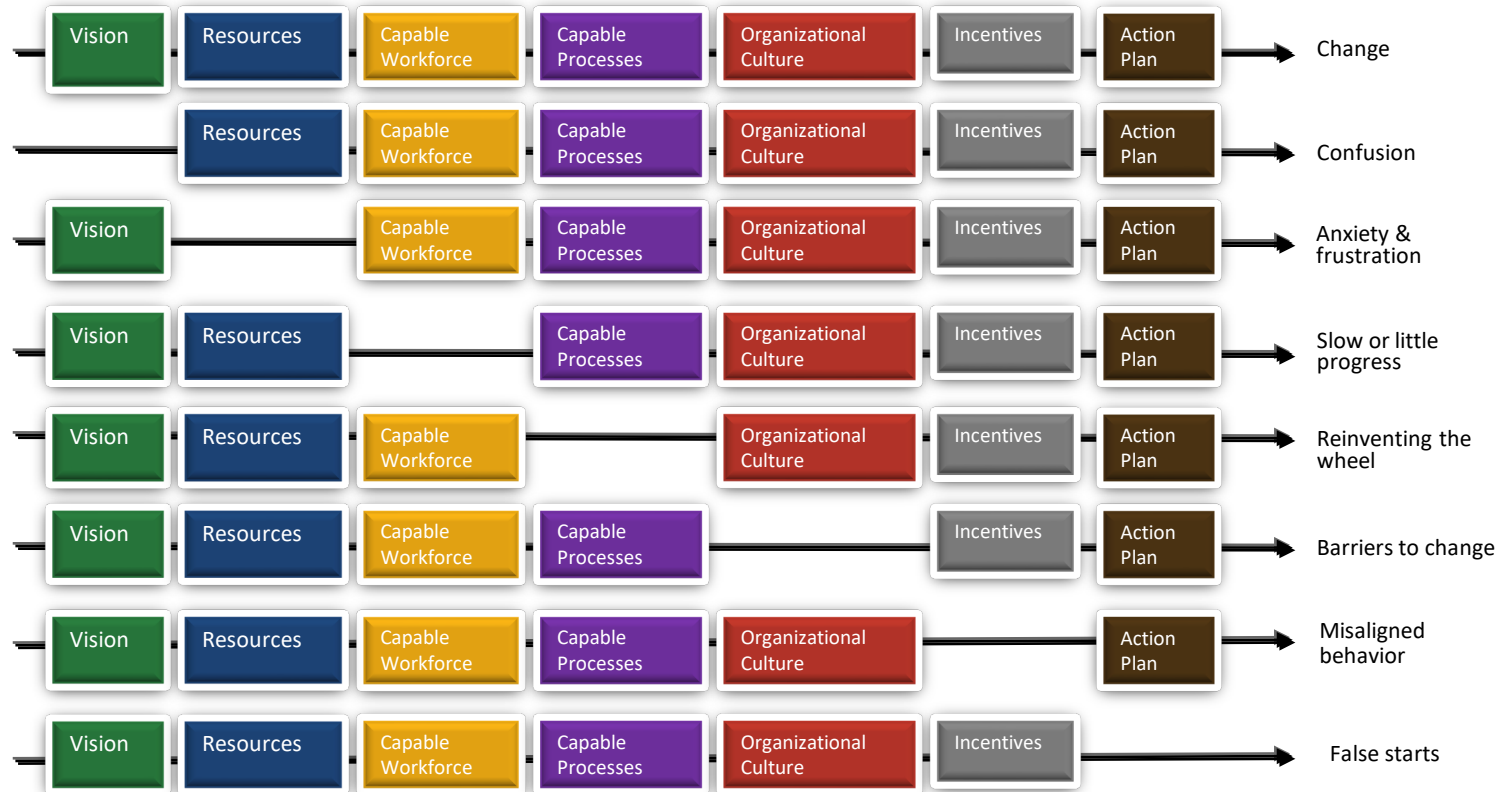| Enhance ability to **manage** changing priorities

| **Accelerate** value delivered

| **Increase** productivity

Success Factors in Adopting New Practices – What Can We Learn?

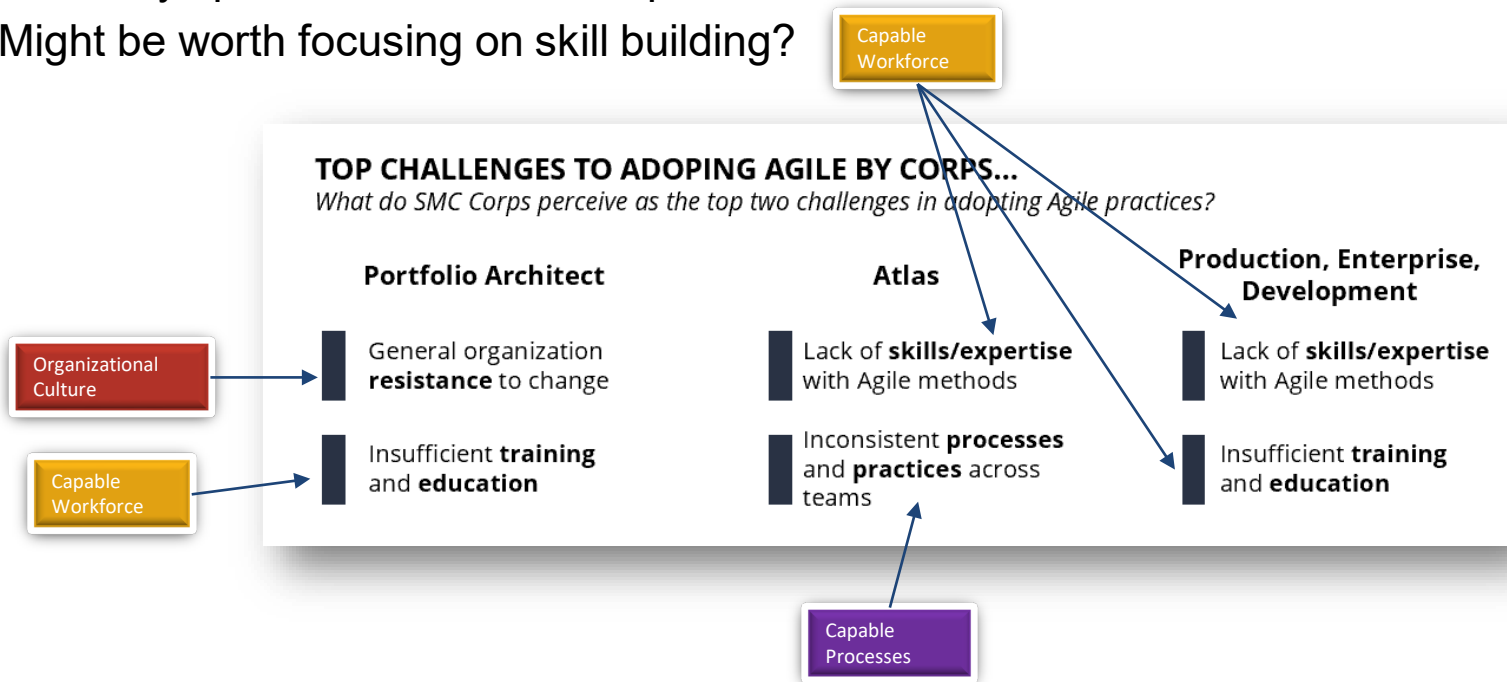| Vision	Resources	Capable Workforce	Capable Processes	Organizational Culture	Incentives	Action Plan	Result
Vision	Resources	Capable Workforce	Capable Processes	Organizational Culture	Incentives	Action Plan	Change
	Resources	Capable Workforce	Capable Processes	Organizational Culture	Incentives	Action Plan	Confusion
Vision		Capable Workforce	Capable Processes	Organizational Culture	Incentives	Action Plan	Anxiety & frustration
Vision	Resources		Capable Processes	Organizational Culture	Incentives	Action Plan	Slow or little progress
Vision	Resources	Capable Workforce		Organizational Culture	Incentives	Action Plan	Reinventing the wheel
Vision	Resources	Capable Workforce	Capable Processes		Incentives	Action Plan	Barriers to change
Vision	Resources	Capable Workforce	Capable Processes	Organizational Culture		Action Plan	Misaligned behavior
Vision	Resources	Capable Workforce	Capable Processes	Organizational Culture	Incentives		False starts

Adapted by Buttles (2010) from: Delorise Ambrose, 1987

Using Baseline Diffusion and Infusion Data to Shape Adoption Support

Questions related to barriers to adoption provide indicators of where resources can be productively spent to accelerate adoption:

- Might be worth focusing on skill building?

TOP CHALLENGES TO ADOPING AGILE BY CORPS...
What do SMC Corps perceive as the top two challenges in adopting Agile practices?

Portfolio Architect	**Atlas**	**Production, Enterprise, Development**
General organization **resistance** to change	Lack of **skills/expertise** with Agile methods	Lack of **skills/expertise** with Agile methods
Insufficient **training** and **education**	Inconsistent **processes** and **practices** across teams	Insufficient **training** and **education**

Capable Workforce

Organizational Culture

Capable Workforce

Capable Processes

Summary

Understanding Diffusion and Infusion measure of adoption can inform how we look for evidence of adoption as well as identify barriers to adoption

The SMC State of Agile Report, an adoption baselining activity in Sept 2019, targeted baselining both diffusion and infusion in its questionnaire

Results from the baseline report indicate that SMC is still far from "routine" in its use of Lean and Agile methods

Future reports will allow monitoring of the pace of adoption progress because SMC collected the initial data set

Any Questions?

Suzanne Miller

Principal Researcher
Software Engineering Institute

smg@sei.cmu.edu
www.sei.cmu.edu/go/agile