



Systems Thinking and Social Capabilities: Toward a More Inclusive View of Engineering Competencies for High Performance in Sociotechnical Enterprises

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Dr. Heidi Davidz, Pratt & Whitney Rocketdyne

LAI Knowledge Exchange Event
April 10, 2012

Welcome and Introductions

- Name
- Organization
- Interest in the Topic

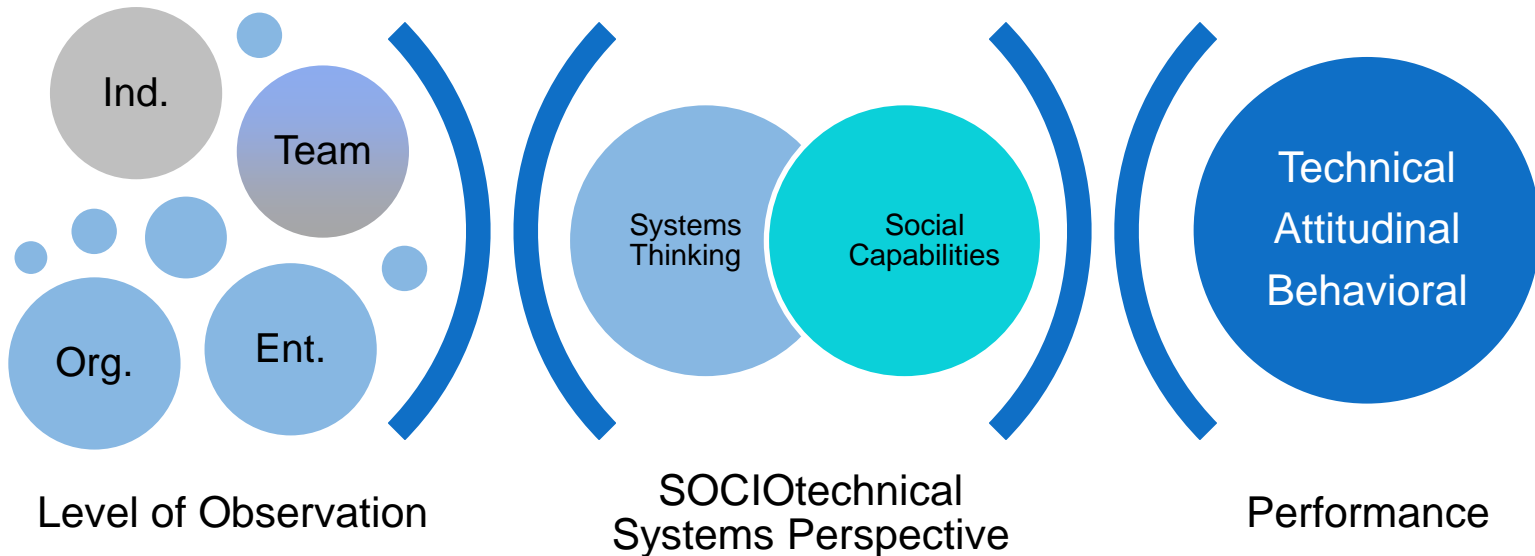
Overview

Motivation for STS View of Team, Org, and Enterprise Competencies

Presentations

Workshop/Brainstorming/Discussion

Next Steps



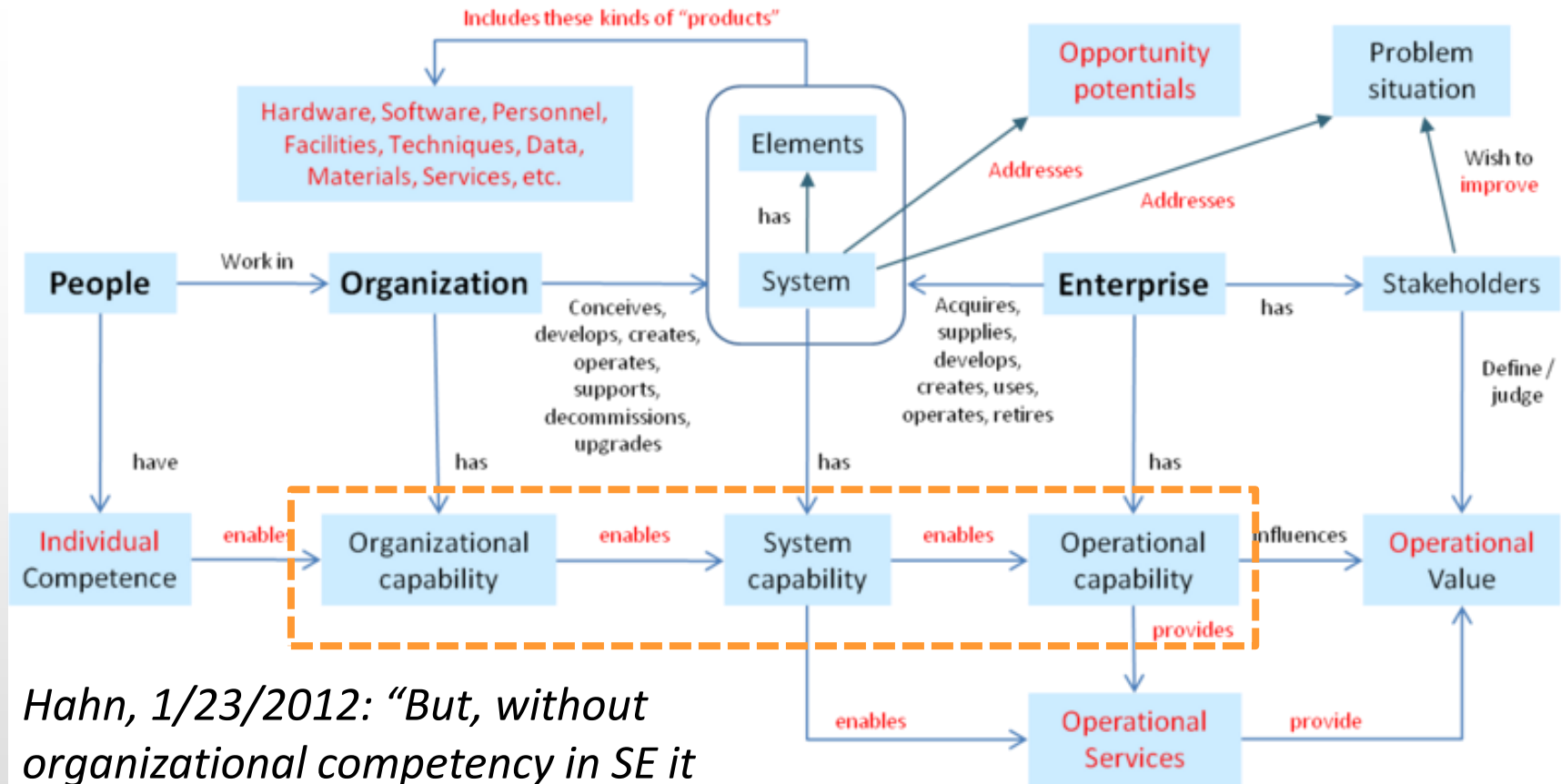
Topics for Knowledge Exchange Event: April 2012

- Defining and discussing future empirical studies and practitioner insights on collaborative systems thinking
- Defining the set of social capabilities for consideration: e.g., external perspective, internal processes, management support, relational coordination
 - When examining engineering work, is there a factor that we are perhaps missing that should be considered?
- Impact of level of analysis: individual → team → organization/system → interorganizational/enterprise/SoS
- Impact of heterogeneity/cross-functionality of the work: e.g., systems engineering teams v. program management v. SE/Project Management interactions
- What is the impact of collaborative systems thinking and social skills on performance (e.g., improved efficiency, quality, radical innovation)?

Motivation

- Several Studies, but Piecemeal approach to area
- Great Interest in the community
- No research agenda at a community level
- Ongoing practitioner community activities

From Individual to Team & Organizational Competencies, and Beyond...



Hahn, 1/23/2012: "But, without organizational competency in SE it will be difficult for competent individual SEs to succeed in their organizational context"

Systems Thinking

- Enterprise perspective, acknowledging interconnectedness of product system with enterprise system that develops and sustains it
 - Understanding, architecting and developing organizational structures, policy system, processes, knowledgebase, and enabling technologies as part of the overall engineering system

Social Capabilities

- The social and motivational traits and behaviors that influence performance
- Influenced by Sociotechnical Systems Theory (Emery & Trist, 1960)
- Includes Interpersonal Skills, psychosocial traits, etc.
 - e.g., Trust, Confidence, Empathy, Self-control, Psychological Safety

It is not enough to understand systems thinking in individuals but also how it emerges in groups and enterprises (Lamb, 2008)

Agenda

9:00 – 9:15am	Welcome and Introductions of Participants
9:15 – 9:30am	Review of Agenda and Kickoff Presentation: Systems Thinking and Social Competencies, Dr. Wiljeana Glover, MIT LAI
Round-robin of Presentations (20 minutes + 5 minute discussion for each)	
9:30 – 9:55am	Dr. Donna Rhodes, MIT LAI & Systems Engineering Advancement Research Initiative <ul style="list-style-type: none"> The Big Picture: Historical View of Systems Thinking and Social Competencies in Research and in Practice
9:55 – 10:20am	Dr. Josef Oehmen, MIT LAI <ul style="list-style-type: none"> Motivating Example: Socially-related Lean Enablers for Systems Engineering and Program Management (INCOSE and PMI Study)
10:20 – 10:45am	Dr. Heidi Davidz, Pratt & Whitney Rocketdyne <ul style="list-style-type: none"> Systems Engineering Competency: Industrial Perspectives
10:45 – 11:00am	Break
11:00 – 11:25am	Dr. Danielle Wood, Alumna, MIT Engineering Systems Division <ul style="list-style-type: none"> Motivating Example: Systems Thinking Development and Capability Building in Established and Emerging Space Programs
11:25 – 11:50am	Mr. George Rebovich, The MITRE Corporation <ul style="list-style-type: none"> Motivating Example: Social and Technical Success Patterns in Systems Engineering of IT Intensive Systems (MITRE Study)
11:50 – 12:15pm	Dr. Wiljeana Glover <ul style="list-style-type: none"> From Teams to Organizations and Inter-organizations: Measures of Systems Thinking and Social Competencies from Production and Healthcare
12:15 – 1:00pm	Lunch break. Defining groups and facilitators.

Agenda

1:00 – 2:00pm	Workshops: Identifying Future Studies and Practical Implementations for Team/Org/Enterprise Competencies 3 groups 45 minutes collection 15 minutes documentation
2:00 – 2:15pm	Break
2:15 – 2:55pm	Report-out of group findings 5 minutes report-out per group 5 minutes discussion per group
2:30 – 3:00pm	Planning session/Next Steps <ul style="list-style-type: none">• Plans for Systems Engineering Research Agenda Paper• Executing key studies in research agenda<ul style="list-style-type: none">○ Approach○ Potential Participating Companies and Professional Groups○ Timeline
3:15pm – 3:45pm	Feedback and Wrap Up; Adjourn

Outcomes

- Linking systems thinking and social competencies
- Preliminary documentation of current best practices in systems thinking and social competencies within team-, organization-, and enterprise-level competency models
- Develop plans and timeline for publication of this preliminary documentation and research agenda in *Systems Engineering*
- Develop time and determine potential participants for additional studies of team-, organization-, and enterprise-level competency model use, their inclusion of systems thinking and social competencies, and impact on performance