Enabling Success in IT-Intensive Acquisitions

Bootstrapping Grass-Roots Success

George Rebovich, Jr.
Dr. Joseph K. DeRosa

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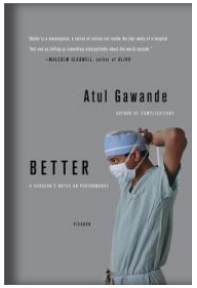
Introduction

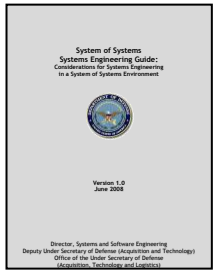
- SE & acquisition of IT-intensive systems resistant to improvement despite numerous attempts at reform
  - Both more & less oversight have produced unsatisfactory results
  - Better requirements gathering, evolutionary development, etc. seem not to produce lasting results
- Common approach is to spotlight recent high-profile failures and posit fixes
  - Adaptations of commercial sector or skunk works practices
- Transplanted solution approaches often fail [1]
  - Which practices should be copied intact, which modified (and how), & which ignored to duplicate success in the new environment?
  - Interactions among multiple practices not always fully understood
- Premise
  - Good acquisition & SE is possible in complex environments
  - Instances of success already exist in our programs
  - Best way to improve – bootstrap grass-roots success
- Goal
  - Find & package existing patterns of SE success in complex environments
  - Use method of positive deviance

Positive Deviance

- **Short history**
  - **Pioneered by the Sternins in fighting malnutrition [2]**
  - **Later applied to management problems by Seidman & McCauley [3]**
  - **Popularized by Gawande in best selling book *Better* [4]**



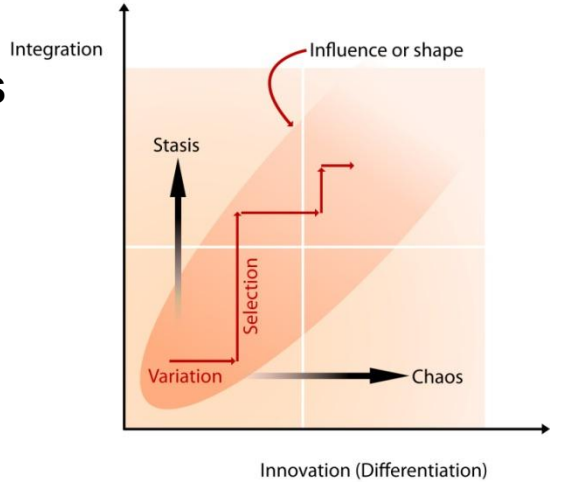
- **Every community performing an activity has individuals or teams whose attitudes, practices, strategies or behaviors enable them to function more effectively than others with the same resources & environmental conditions**
- **Examples**
  - ***Save the Children* Anti-Starvation program [4]**
  - **Hand washing & hospital infections [4]**
  - **AT&L System of System Engineering Guide [5, 6]**



- **Find and package patterns of success; spread across your enterprise**
  - **Attribution of credit problems less severe**
  - **“Inside” solutions more likely to achieve acceptance**

Positive Deviance: An Evolutionary Approach to Improvement

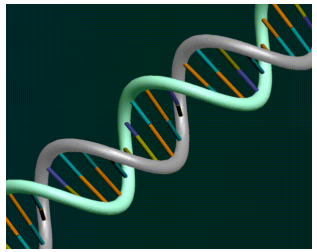
- **Variation**
  - Occurs in government department or agency SE/acquisition practices, processes & procedures
  - Misunderstanding of inexperienced team
  - Shortcuts to meet deadlines or other pressures
  - Deliberate attempts to innovate
- **Selection**
  - Identify the few who have succeeded
  - Determine how they do what they do
  - Synthesize and package their ideas
- **Amplification**
  - Communicate the ideas across the enterprise
  - Set expectations that the ideas will be considered by the rest of the enterprise
  - Measure and reward change in outcomes and communicate the results across the enterprise



Note: The effort reported in this briefing addressed variation and selection activities.

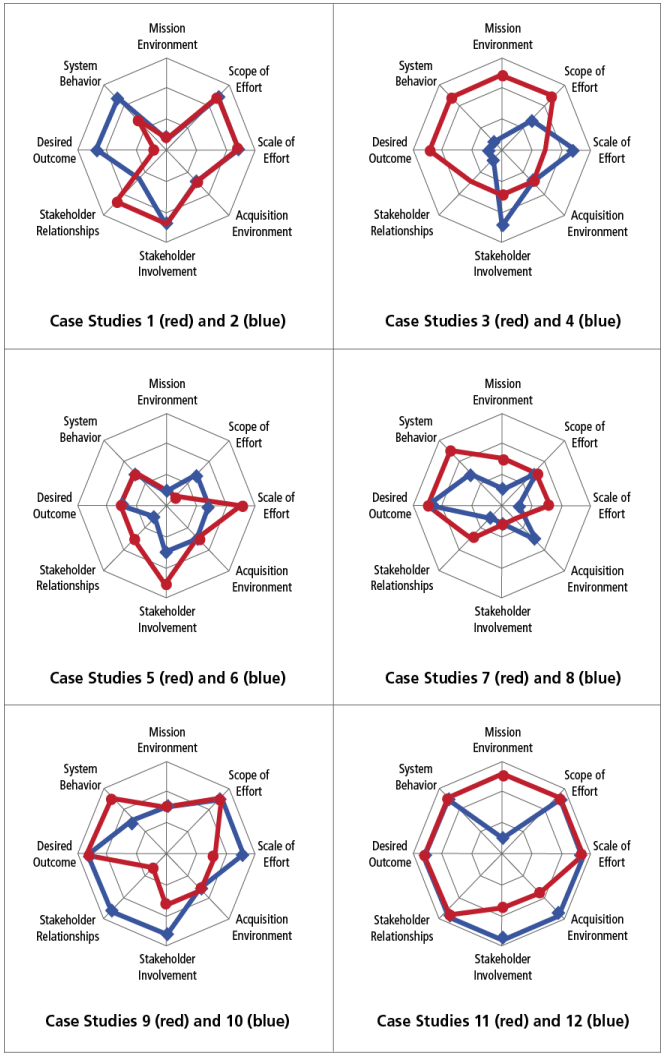
Patterns

- Short history
  - Introduced by architect C. Alexander in building & city design [7]
  - Used in software design, systems architecture, more recently in SE [8-13]
- Examples
  - Construction – housing arrangement in development; electrical & plumbing distribution; wall design
  - Object-oriented programming – delegation; aggregation; model-view-controller
  - WWW – hypertext linking; browser rendering of web pages
- Key pattern principles
  - Provide tested methods – incorporates past experience
  - Latitude for innovation – to tailor to situation at hand
  - Improvement via adaptation – communicability enables evolution [14]
- Patterns capture essential nature of a design, are re-usable
  - Context – defines larger system that contains & constrains design
  - Forces at work – expresses relationships among elements in a context
  - Solution – presents a design that resolves the forces
- Used in this work to communicate positive deviance in SE & acquisition



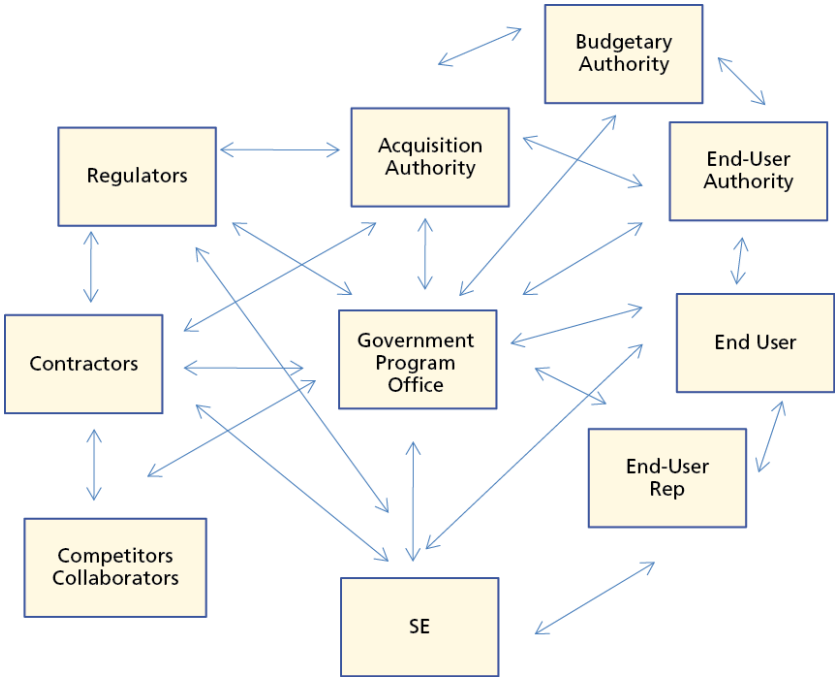
Anatomy of Programs Analyzed

- Identified 30 successful IT-intensive programs across government
  - Program capabilities to be embedded in larger information enterprise
  - Some notable program success
  - Ability to deal with uncertainty and conflict
  - Success ≠ just project or program survival
- 12 selected for detailed analysis
  - US-only developments
  - 4 had coalition or international partners
  - 6 had multi-organization users
- Moderate to high complexity (see adjacent panel) [15]
- Extensive interviews with front-line SEs who create or observe positive deviance in practice
- Asked what they did & how they did it
  - No leading questions
  - No shaping of discussion unless it strayed off topic or towards hypotheticals

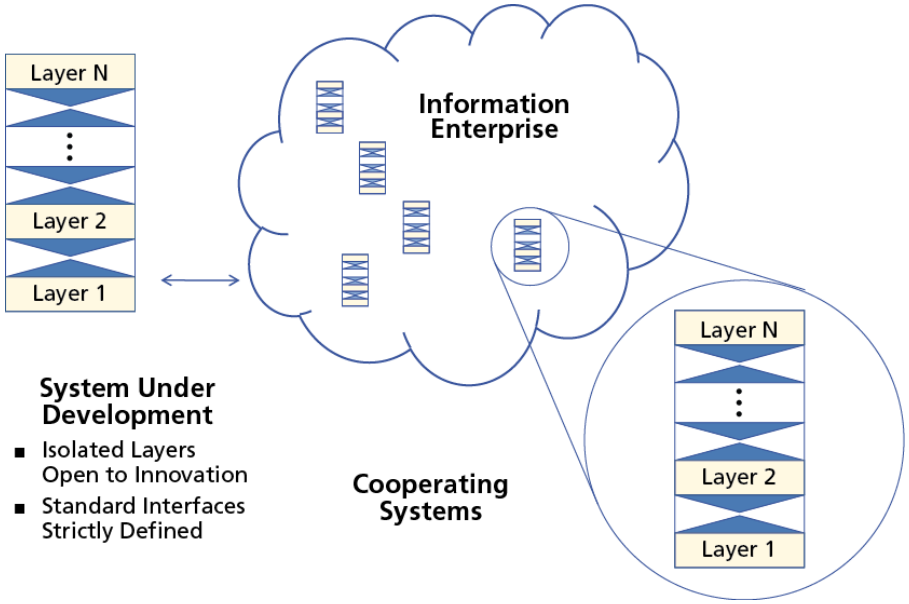


Large-Scale Patterns of Success

Balancing the Supply Web



Harnessing Technical Complexity



Addresses "social" interdependencies among enterprise stakeholders with different equities in capability under development ….

Addresses technical interdependencies among system components that together deliver an operational enterprise capability….

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Balancing the Supply Web Sub-Patterns

Sub Pattern	Description
Up Close and Personal	Establishes strong and intimate ties with end users to ensure satisfying a high-priority, pressing need
Close, But Not Too Close	Concentrates on getting a large number of end users to accept a standard set of capabilities and compensating them with rapid deliveries of their most valued capability
Divide and Conquer	Deals decisively with all stakeholders by dividing them into groups and satisfying each group's interests separately deals decisively with all stakeholders by dividing them into groups and satisfying each group's interests separately
Circle of Trust	Fosters positive social interactions among stakeholders to improve the willingness of opposing factions to compromise
Role and Responsibility Subnets	Clearly defines subnets within the stakeholder community for each decision or product to be supplied
Seek Secondary Sources	Seeks small flows of resources from secondary sources that have large impact on robustness of program and capability delivered
Network Beats the Node	Deliberately takes advantage of relationships in the network of stakeholders to create a resource greater than the sum of the parts
Top Cover	Uses informed acquisition authorities to shape the stakeholder environment

Harnessing Technical Complexity Sub-Patterns

Sub Pattern	Description
Seeing Is Believing	builds a capability reference implementation for the enterprise that shows what can be done, how it works, and what it should do when done
Riding on the Infrastructure	Builds new capabilities on top of the existing infrastructure
Loose Couplers	Establishes isolation between layers and integration across the enterprise
Social and Technical Alignment	Aligns people, processes, and technologies to match development and acquisition to the enterprise structure.
Plan to Re-plan	Stimulates desired behavior through feedback and incentives, and then learns from results what behavior is desired next
Technology Surfing	Uses an ongoing process of identifying new and emerging technologies, experimenting with them, and integrating what works into the evolving enterprise—“catch the next technology wave” rather than “create or wait for the big one”
Architect.org	Government program office team assumes full responsibility for architecting and overseeing development of the system capability

Summary

- **Complex IT acquisitions continue to stubbornly resist improvements**
  - **In spite of substantial progress in technology, processes and efficiencies**
- **A positive deviance-inspired approach has potential for reversing this trend**
  - **Based on an evolutionary improvement strategy**
  - **Focuses on identifying and amplifying success in an environment instead of solving failures**

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Contact Information

George Rebovich, Jr.
The MITRE Corporation
M/S M370
202 Burlington Road
Bedford, MA 01730-1420

Tel: +1 (781) 271-8503
Email: grebovic@mitre.org