

# The Effect of Enterprise Design on Stakeholders and Value Creation

LTC Doug Matty, PhD, Presenter  
LAI Web Knowledge Exchange Event  
February 10, 2011



**Knowledge Exchange Events**  
*Network - Share - Learn*  
**April 14, 2011**  
**Enhancing Cost Realism  
Though Risk-Driven  
Contracting**




Web KEE




**Knowledge Exchange Events**  
*Network - Share - Learn*  
**April 28, 2011**  
**Post-Traumatic Stress  
Innovations: Latest  
Findings**



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**Knowledge Exchange Events**  
*Network - Share - Learn*  
**May 5, 2011**  
**LEPD Whitepaper Series  
Discussion**



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**Knowledge Exchange Events**  
*Network - Share - Learn*  
**May 19, 2011**  
**Enterprise Improvement:  
an Engineering Case Study**



Web KEE

# We Share A Common Goal: Enterprise Excellence

**BAE SYSTEMS**



**Raytheon**



*Rockwell  
Collins*

***NORTHROP GRUMMAN***



**CEAGA**   
Cluster de Empresas de Automoción de Galicia



**SIEMENS**



- Motivation
- Literature Review – Domain and Theory
- Theory Development
- Case Study Methodology
- Theoretical Contributions
- Policy Implications
- Future Work

## DOD Acquisition Studies/Challenges

“Entrenched attitudes throughout the government are particularly pronounced in the area of acquisition: *a risk-averse culture, a litigious process, parochial interests, excessive and changing requirements, budget churn and instability*, and sometimes *adversarial relationships* within the Department of Defense and between DoD and other parts of the government ... **Since the end of World War II, there have been nearly 130 studies on these problems – to little avail.**” (Gates 2009)

**Lot’s of Research – Little Improvement.  
Using a multidiscipline approach might provide a  
“new” perspective and a theoretical contribution.**

- Publications
- Motivation
- Literature Review – Domain and Theory
  - DOD Acquisition
  - Value Creation
  - Enterprise Architecture
  - Stakeholder Theory
- Theory Development
- Case Study Methodology
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# Forty Years of Acquisition Reforms

1970 Packard Memo

1984 Grace Commission

1986 Packard Commission

1986 Goldwater-Nichols Act

1989 Defense Management Report

1990 Defense Acquisition Workforce Improvement Act

1994 Perry: Acquisition Reform Mandate for Change

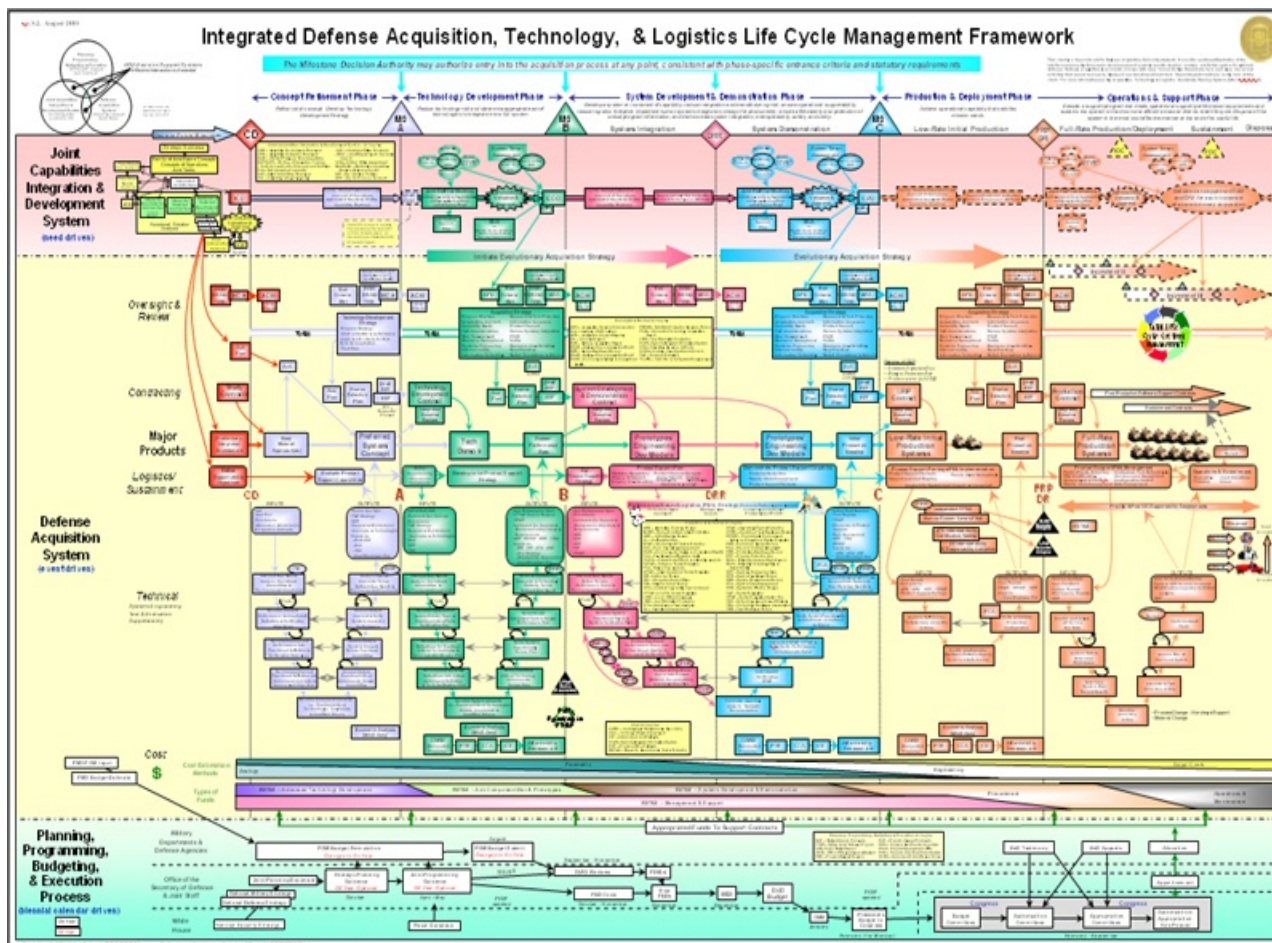
1996 Clinger-Cohen Act

1998 Gansler Congressional Testimony –  
DOD Acquisition “Death Spiral”

2002 Rapid Fielding Initiative

2009 Weapon Systems Acquisition Reform Act

# 'Reformed' DOD System Lifecycle Management



DAU 2009

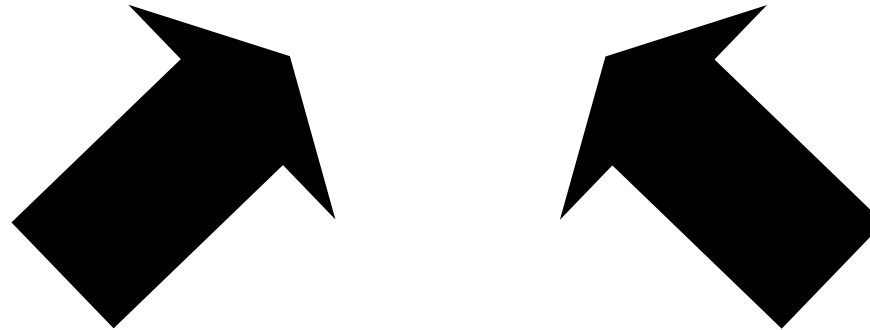


# Current “Program Thinking”

The Acquisition Process follows Systems Engineering Principles, driving program management methods.

## Program Management

Probability for Program Success reporting system: technical metrics and one subjective assessment Program Advocacy.



**User Requirement**

**Program Advocacy**

**We are beginning to adopt a new approach to management, realizing that we need to shift from managing a “program process” to managing a “program enterprise.” (Senior Executive 2008)**

# Value Creation Process Framework



**Identification** – Identify needed capabilities of product or service  
Identify stakeholders and their competencies

**Proposition** – Formalize product capabilities and requirements  
Define tasks in value stream and map to stakeholder roles

**Delivery** – Deliver on the promise; provide capability

**Creating Value is the cornerstone of a successful enterprise.**

**Adapted from Murman, et al, 2002**

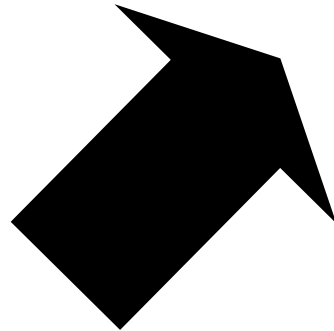
# Enterprise Architecture Framework Views

View	Description
Strategy	This view includes the goals, vision and direction objectives of the enterprise with an emphasis on the business model and competitive environment.
External Factors and Policies	The external regulatory, political and societal environments in which the enterprise operates.
Process	The lifecycle, enabling and leadership processes by which the enterprise creates value for its stakeholders.
Organization	The organizational structure as well as the relationships, culture, behaviors, and boundaries between individuals, teams and organizations.
Knowledge	The implicit and tacit knowledge, capabilities, intellectual property collectively in the enterprise.
Infrastructure/Infostructure	The physical layer of the enterprise including real estate, facilities and etc., as well as the network systems and technologies needed to ensure resource availability.
Product/Services	The product architectures and the service architecture of the enterprise, including services as a primary objective or in support of products.

Adapted from Nightingale & Rhodes 2004  
 Rhodes, Ross, & Nightingale 2009  
 Ackoff, et al, 2006

# Building A Dynamic Enterprise Engineering System Framework

**Enterprise  
Architecture**



**Value  
Creation**

**“Enterprise...an integrated entity that efficiently creates value for its multiple stakeholders...”**

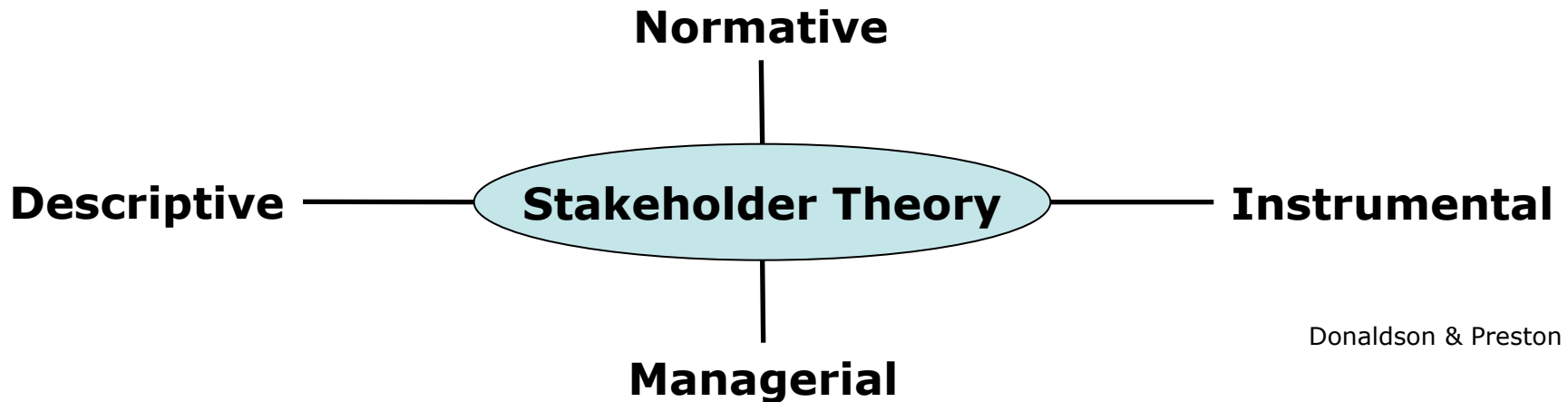
**Murman, et al, 2002**

# Interorganizational Relationships

<b>Transaction Costs Economics</b>	<b>Resource Dependency</b>	<b>Strategic Choice</b>	<b>Stakeholder Theory</b>	<b>Learning Theory</b>	<b>Institutional Theory</b>
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**Economic** ←————→ **Behavioral**

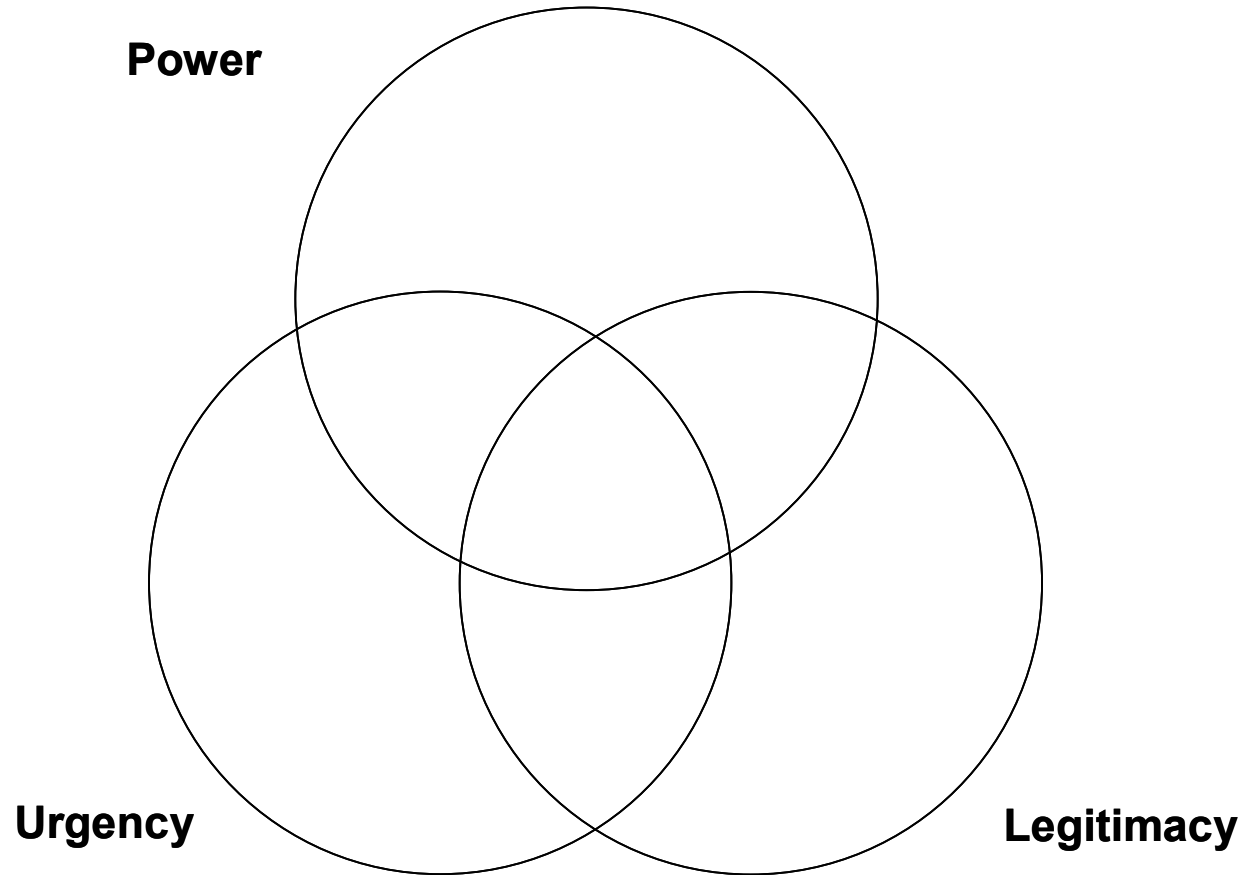
Barringer Harrison 2000



Donaldson & Preston 1995

**The stakeholder theory is intended both to explain and to guide the structure and operation of the established corporation.  
(Donaldson & Preston 1995)**

# Stakeholder Salience Framework

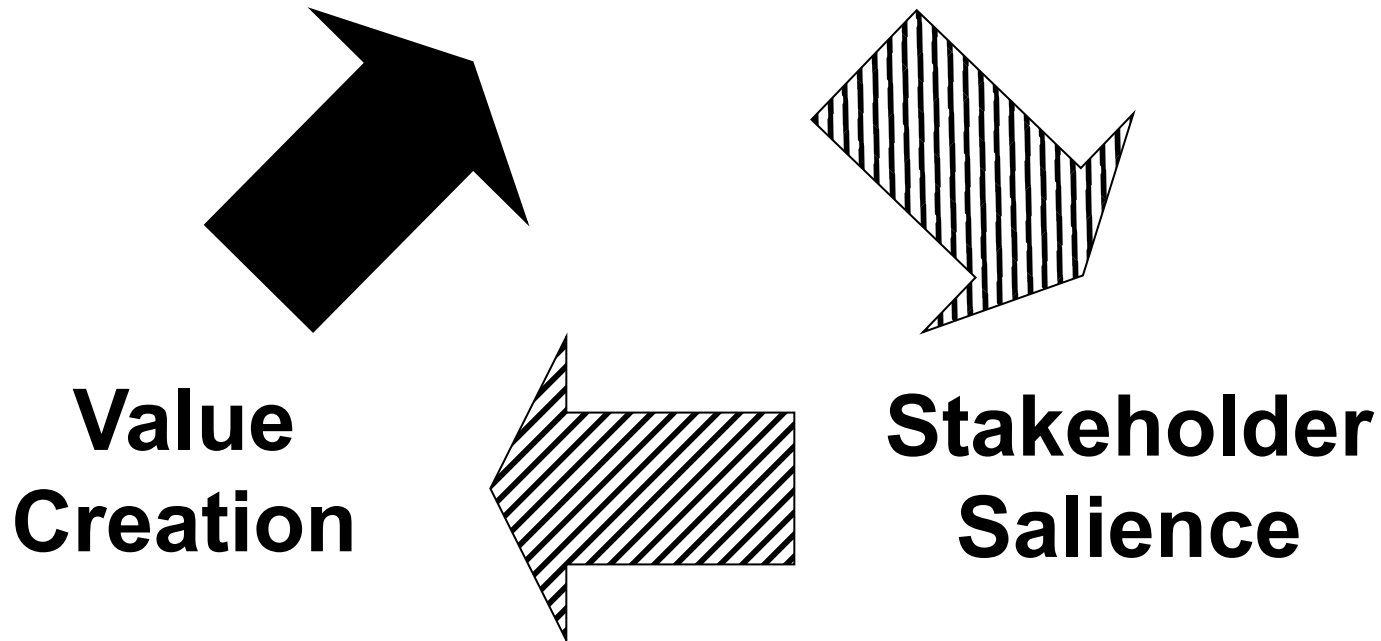


**...we can envision refinements in long-standing management techniques designed to assist managers in dealing with multiple stakeholders' interests. (Mitchell, Agle, Wood 1997)**

- Publications
- Motivation
- Literature Review – Domain and Theory
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# A Dynamic Enterprise Engineering System Framework

## Enterprise Architecture

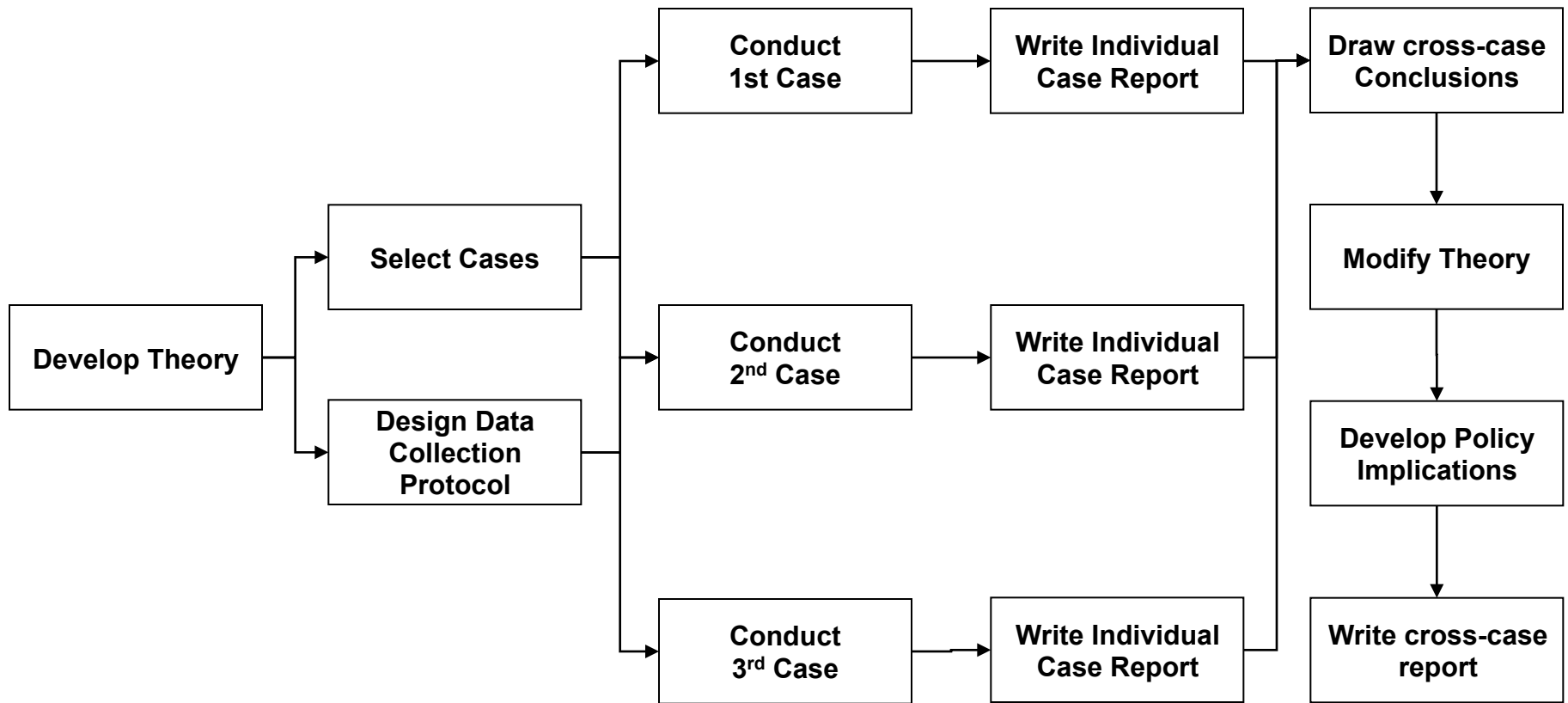


How does stakeholder salience influence value creation in a bureaucratic program enterprise?



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# Over-arching Research Methodology

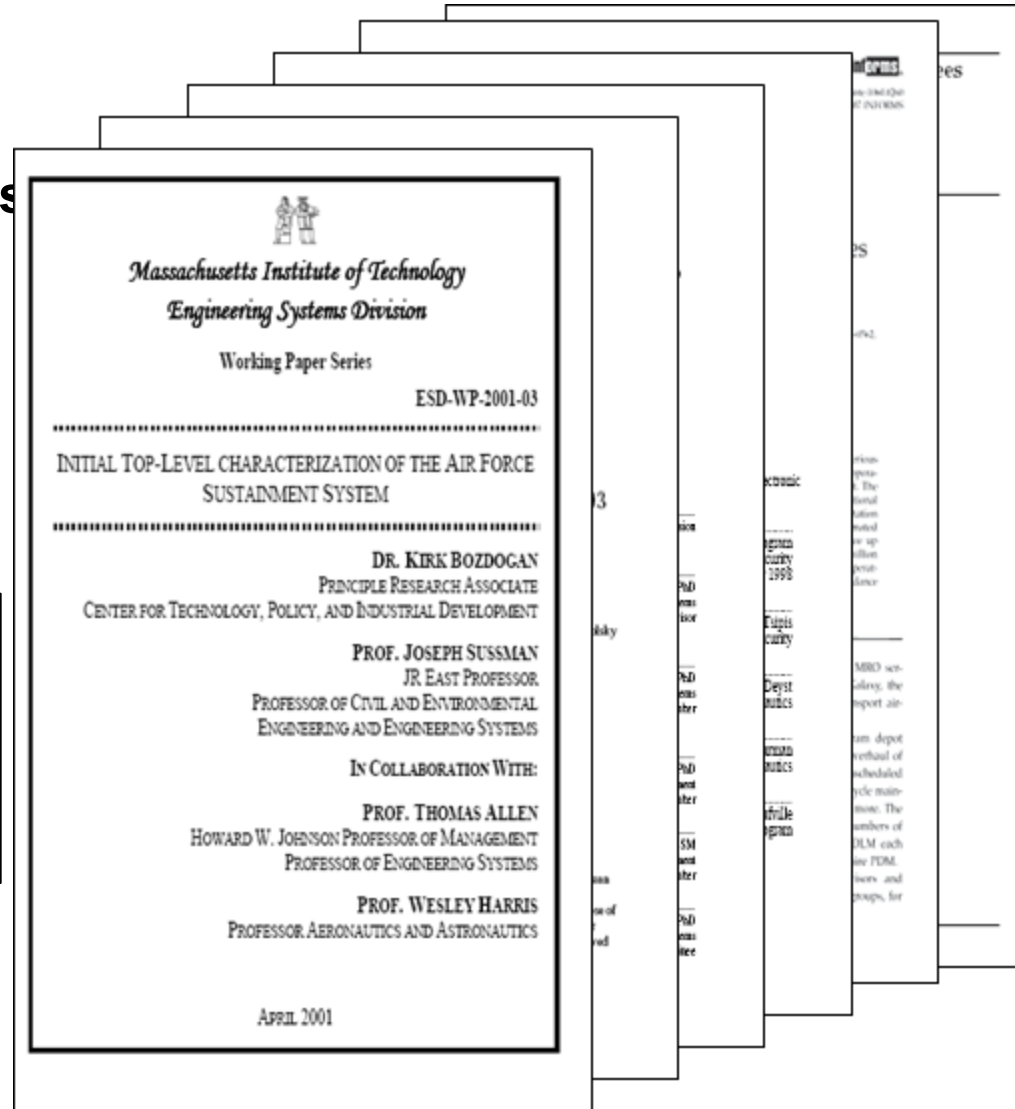


Adapted from Yin, 2009

**“Replication, not sampling logic, used for multiple case studies.”  
 (Yin, 2009)**

# With-in Case Study Methodology

1. Motivation
2. Review Existing Case Studies
3. Develop Initial Hypotheses
4. Crafting Protocols
5. Collect Data
6. Analyze Data
7. Refine Hypothesis
8. Enfolding Literature
9. Closure



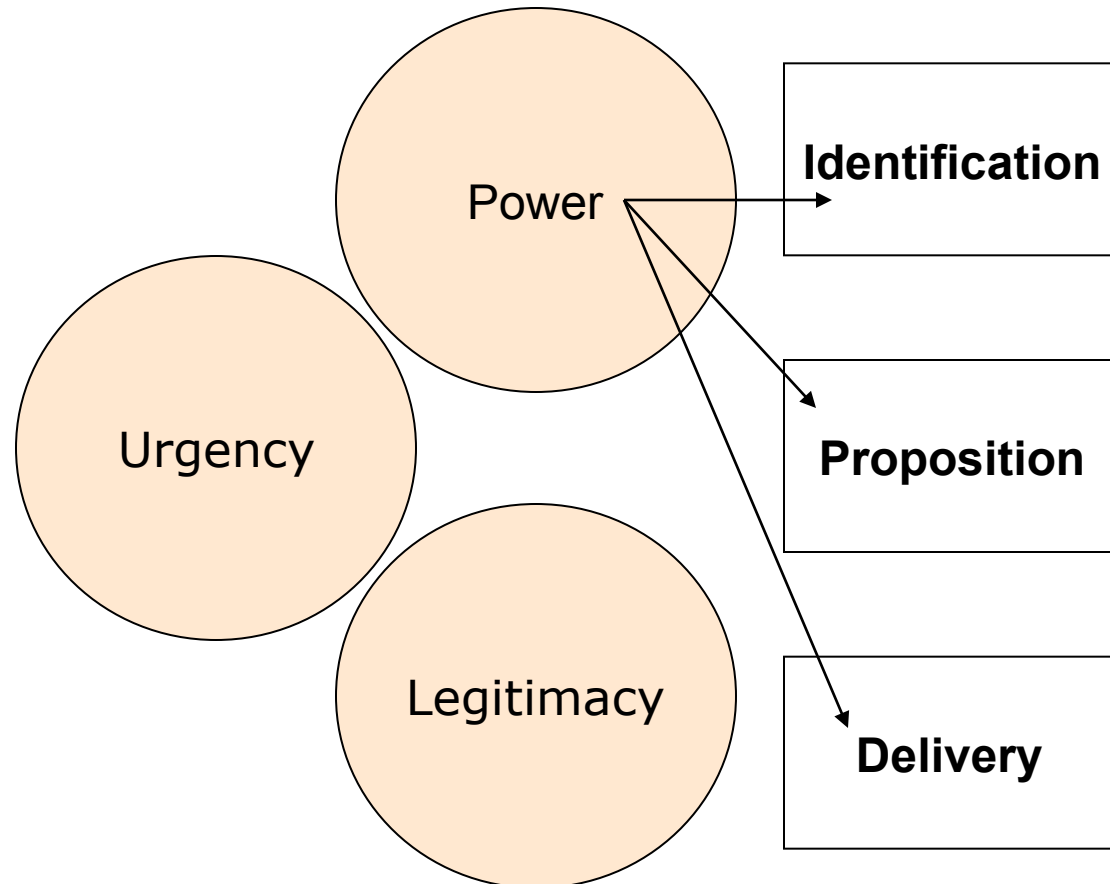
Adapted from (Eisenhardt, K.M., 1989; Yin, 2009)

# Case Selection – Replication Logic

Program	Capability	Executive Agent	Program Executive Office
1	Aerial Reconnaissance	Army	Aviation
2	Aerial Reconnaissance	Army	Aviation
3	Aerial Reconnaissance	Army	Aviation

**“Replication, not sampling logic, used for multiple case studies.”  
 (Yin, 2009)**

# Data Collection (P1) – Survey-based Interview



Adapted from Mitchell, et al, 1997

Adapted from Murman, et al, 2002

Adapted from Seigle 2009

Unimportant	1
	2
Of Little Importance	3
	4
Moderately Important	5
	6
Important	7
	8
Very Important	9
	10

**“The influence of <Salience Attribute> on  
 <Value Creation Process> is <#>.”**

# Data Collection (P2) – Survey-based Interview

## Stakeholder Salience

## Enterprise Architecture

- Urgency
  - Criticality
  - Importance
- Power
  - Coercive
  - Utilitarian
  - Symbolic
- Legitimacy
  - Pragmatic
  - Moral
  - Cognitive

Urgency Factor	Level Description	Level range
<b>Criticality</b>	The stakeholder is time insensitive or has very low demands for a timely response to its claims at risk in the enterprise	0-2
	The stakeholder asks for its stakes or values with enough anticipation allowing the enterprise to attend them in a timely manner	2-4
	The stakeholder requires attention to its stakes in plausible or reasonable times	4-6
	The stakeholder calls for a prompt attention to the stakes at risk in the enterprise	6-8
	The stakeholder demands immediate attention to the stakes it compromise in the enterprise and their associated payoffs	8-10
<b>Importance</b>	The stakeholder has null or very low dependency on the stakes it puts at risk in the enterprise	0-2
	The stakeholder shows low dependency on the values obtained from the enterprise	2-4
	The stakeholder relies on the values obtained from the enterprise for its future actions or operations	4-6
	The stakeholder shows high dependency on the stakes it contributes at risk in the enterprise	6-8
	The stakeholder demonstrates very high dependency on the stakes it puts at risk in the enterprise and on the values obtained from it	8-10

- External Factors/ Policy
- Strategy
- Process
- Organization
- Knowledge
- Infra/Info-Structure
- Product
- Service



Adapted from Mitchell et al 1997 and Grossi 2003

Adapted from Nightingale and Rhodes 2004, Rhodes et al. 2009, Ackoff et al 2007

## Hybrid Data Methods – Triangulation (Jick 1979)

# Data Collection – Lattice Sampling

## Assessed

Respondent	S.Code	S01	S02	S03	S04	S05	S06	S07	S08	S09	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	
	S01	Green	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Green
	S02	Green	Green	Grey	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	S03	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Green	Green	Grey	Grey	Grey	Grey	Grey
	S04	Grey	Grey	Grey	Green	Grey	Grey	Green	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Green	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey
	S05	Grey	Green	Grey	Grey	Green	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	S06	Grey	Grey	Grey	Grey	Grey	Green	Grey	Green	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey	Green
	S07	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey	Grey
	S08	Grey	Green	Green	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green
	S09	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Green	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey
	S10	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Green	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green
	S11	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Green	Grey	Green	Grey	Green	Grey	Grey	Grey	Grey	Grey
S12	Green	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green	Grey	Grey	

**“A type of two-way stratified sampling, named "LATTICE SAMPLING" by Yates (1960), appears to be a promising sampling design when small area or intra-universe estimates as well as estimates for the entire universe are desired.”**

**(Abbey 1978)**

- Capability: Aerial Reconnaissance
- Initiated: 1969
- Milestone: Post Milestone C (Sustainment/Retirement)
- Acquisition Category: ACAT III
- Strategy: Spiral Development
- Program Executive Office: Aviation
- Executive Agency: US Army

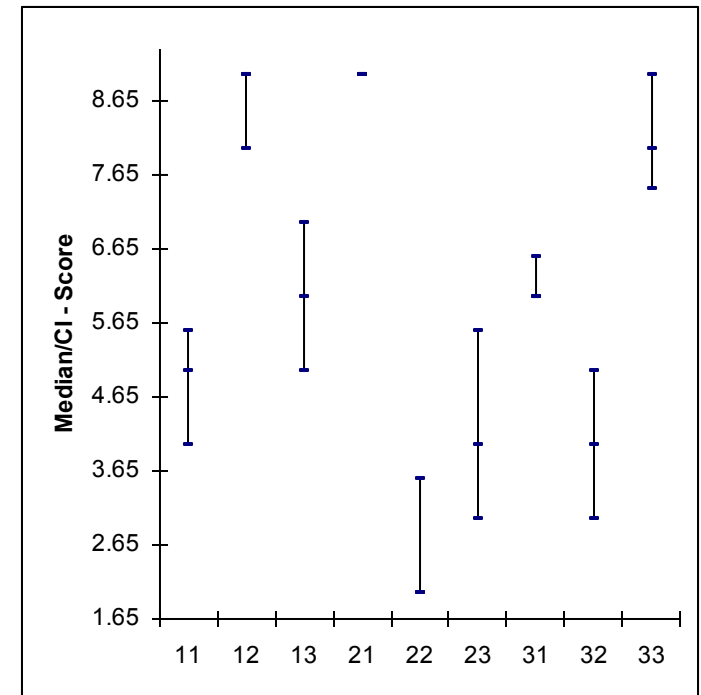


# Case 1: “The influence of <Salience Attribute> on <Value Creation Process> is <#>.”

Assumptions:

- Random Samples
- Independence within each Sample; Mutual Independence among various samples
- Measurement scale at least ordinal
- Either  $k$  population distributions are identical or some the populations tend to yield larger values than other populations

Kruskal-Wallis Nonparametric ANOVA: Score	
$H_0$ : Median 1 = Median 2 = ... = Median $k$	
$H_a$ : At least one pair Median $i \neq$ Median $j$	
Kruskal-Wallis Statistic ( $H$ )	164.48
DF	8
P-value (2-sided, adjusted for ties)	0.0000



Conover, 1999

**Conclude: The stakeholder salience attributes influence the enterprise program value creation process**

# Case 1: Findings P1

Interaction - Code	
Power-Identification	11
Power-Proposition	12
Power-Delivery	13
Legitimacy-Identification	21
Legitimacy-Proposition	22
Legitimacy-Delivery	23
Criticality-Identification	31
Criticality-Proposition	32
Criticality-Delivery	33

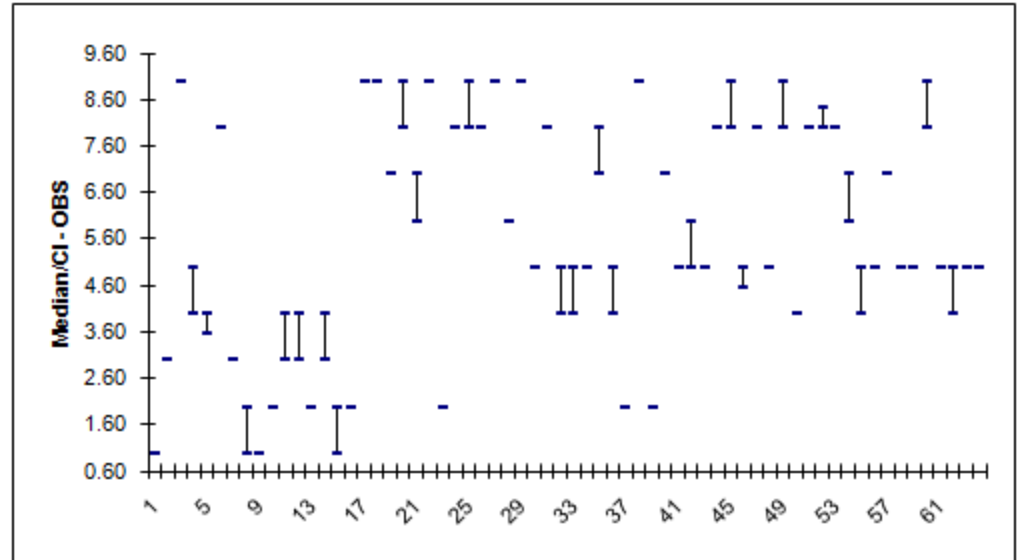
Unimportant	1
	2
Of Little Importance	3
	4
Morderately Important	5
	6
Important	7
	8
Very Important	9
	10

Interaction - Code	11	12	13	21	22	23	31	32	33
Count (N)	23	23	23	23	23	23	23	23	23
Median	5	9	6	9	2	4	6	4	8
Points Below 6	16	0	8	0	23	16	5	19	0
Points Equal To 6	7	0	5	0	0	7	11	4	0
Points Above 6	0	23	10	23	0	0	7	0	23
P-value (1-sided)	1.0000	0.0000	0.4073	0.0000	1.0000	1.0000	0.3872	1.0000	0.0000

**Conclude: The <stakeholder salience attribute> is an important or very important influences the program enterprise <value creation process>**

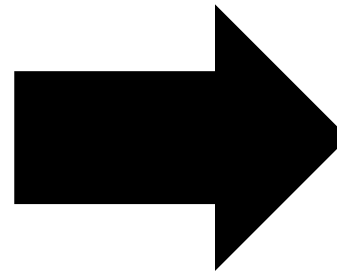
# Case 1: The <enterprise architecture view> influence on <stakeholder salience attribute> is <#>.

Kruskal-Wallis Nonparametric ANOVA: OBS	
H <sub>0</sub> : Median 1 = Median 2 = ... = Median k	
H <sub>a</sub> : At least one pair Median i ≠ Median j	
Kruskal-Wallis Statistic (H)	5557.6
DF	63
p-value (2-sided, adjusted for ties)	<b>0.0000</b>



1 Sample Sign Test for Medians: OBS								
H <sub>0</sub> : Median = 6								
H <sub>a</sub> : Median Greater Than 6								
EAV	Infra/Info-Structure	Knowledge	Organization	Policy/EF	Process	Product	Service	Strategy
Count (N)	920	920	920	920	920	920	920	920
Median	6	5	8	4	8	7	5	2
Points Below 6	372	488	185	644	164	307	463	884
Points Equal To 6	152	117	114	48	93	110	161	22
Points Above 6	396	315	621	228	663	503	296	14
P-value (1-sided)	0.2033	1.0000	<b>0.0000</b>	1.0000	<b>0.0000</b>	<b>0.0000</b>	1.0000	1.0000

## EA Views



## Salience Attributes

### Urgency

Criticality

Importance

### Power

Coercive

Utilitarian

Symbolic

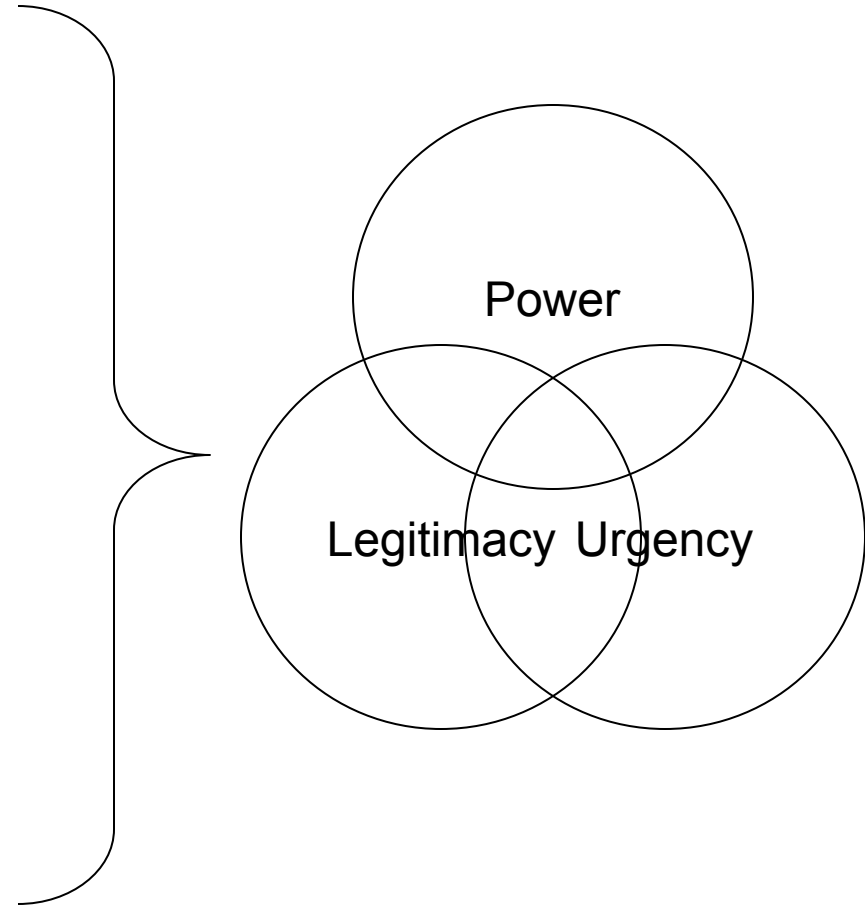
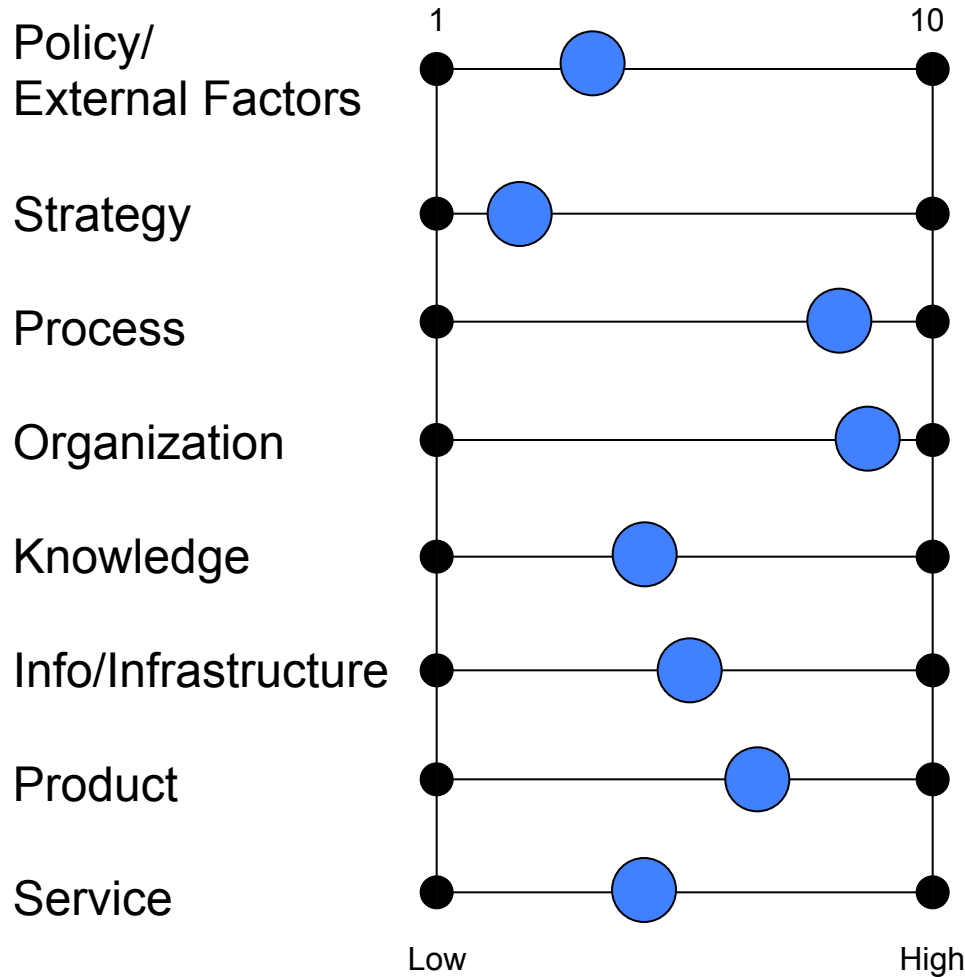
### Legitimacy

Moral

Cognitive

Pragmatic

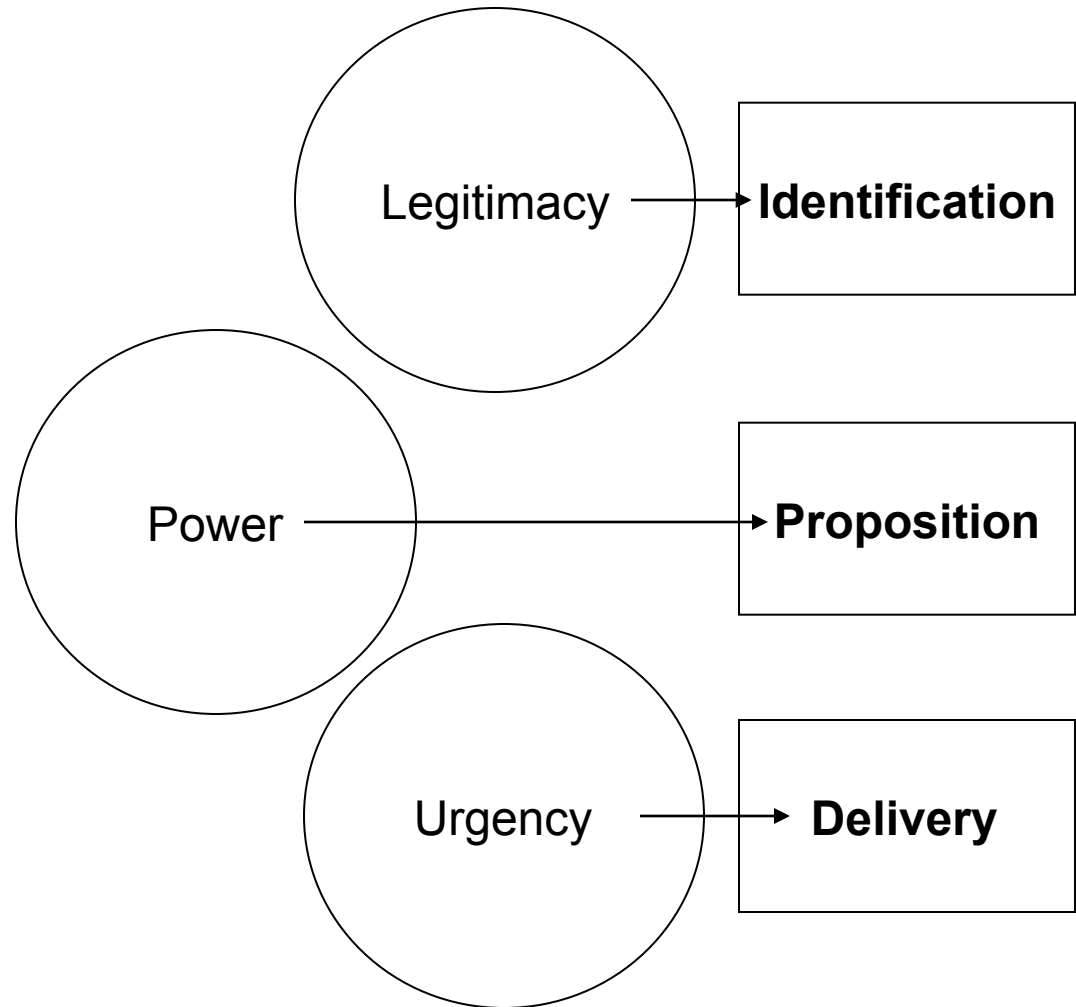
**Bureaucratic Characteristics Dominate – Salience Attributes are influenced by the Enterprise Architecture**



**Enterprise Architecture Views have important influence on Stakeholder Salience attributes**

# Cross Case Analysis

Based on findings, the three Salience attributes are “important” or “very important” in their influence on the respective value creation processes.

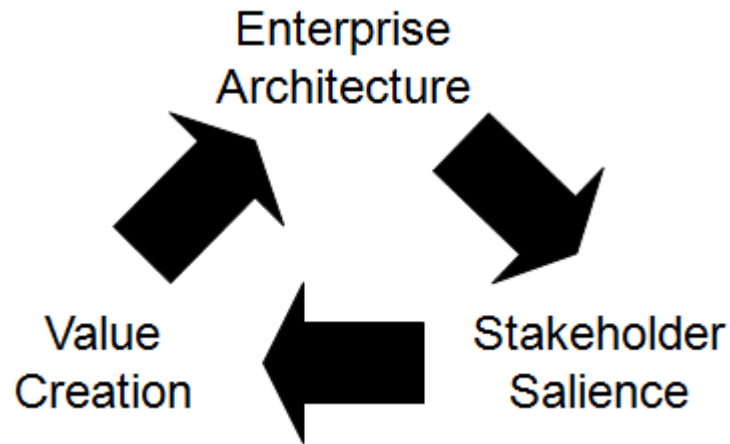


**The stakeholder salience attributes are important influences on the program value creation process.**

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# Theoretical Contributions

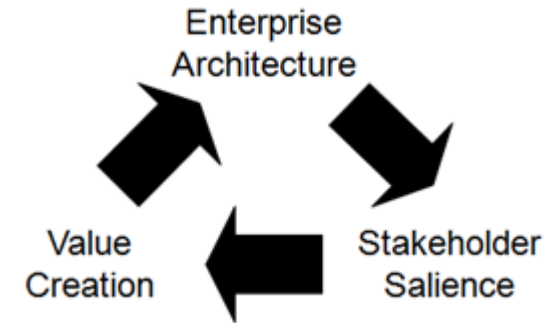
- First to codify influence relationships for dynamic closed loop:



- Uses Engineering Systems field to offer findings that closes theoretical gaps in at least three different disciplines: Engineering, Management and Social Science.
- Developed efficient research methodology minimizing impact on respondents, with high quality – repeatable and reproducible techniques.



# Policy Implications



1970 Packard Memo

1984 Grace Commission

1986 Packard Commission

1986 Goldwater-Nichols Act

1989 Defense Management Report

1990 Defense Acquisition Workforce Improvement Act

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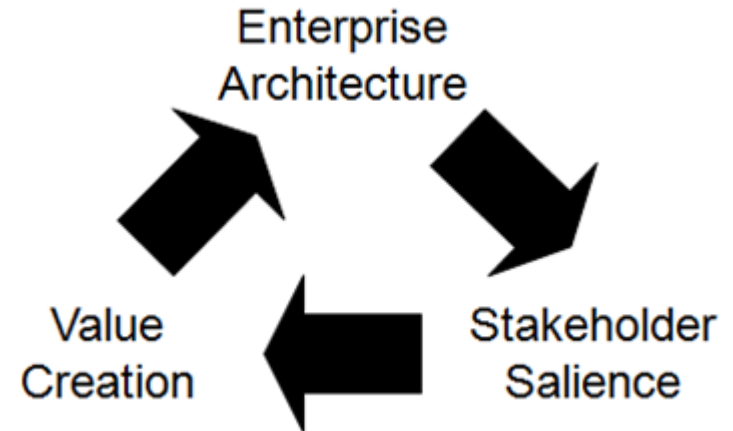
2009 Weapon Systems Acquisition Reform Act

**“... we could have done it ten years ago... It wasn't the technology that was limiting us. It was the organization, the tactics, the strategy, and primarily the culture.”**

**(Dr. J. Gansler Fmr. Under Secretary of Defense for Acquisition, Technology and Logistics, 2002)**

# Policy Implications

Services ↔	DOD ↔	Congress
PMS ↔	Secretary	
AoA upfront ↔	Prototype	
Fixed Price ↔	Cost-Plus	
Eliminate .	Total System	
Total Package ↔	Performance	
Procurement	Responsibility	



## Program Enterprise Policy/Actions

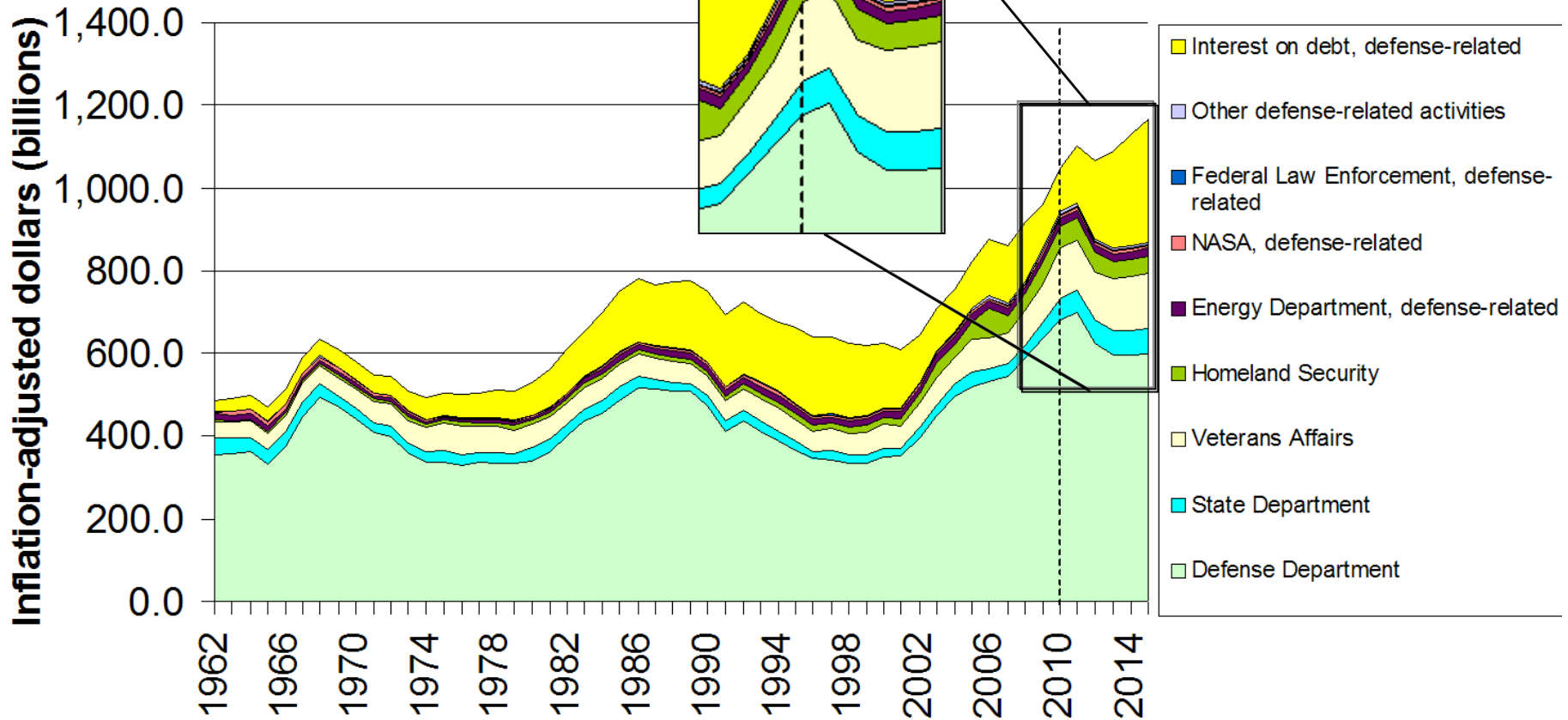
- Develop explicit Program Enterprise Architectures, especially process, organizational, product and strategic views
- Conduct Enterprise Stakeholder Salience Assessment and Publish to Enterprise
- Develop lifecycle approach to governance (i.e. IPT Chair)

- Test generalizability across different programs (ACAT, BOS, etc.)
- Develop self-administered Enterprise Architecture assessment for Enterprise Architecture Views
- Refine Stakeholder Salience Index assessment to incorporate Enterprise Architecture Influence
- Investigate Stakeholder Salience Alignment on Enterprise Value Creation

**“These types of insights from research is why we established the Army Studies Program.”**

**Director of Army Studies 2010**

# Resource Reality; System Shock



<http://www.whitehouse.gov/omb/budget/fy2010/assets/hist03z2.xls>

**"The biggest threat to our nation's security is our debt."  
 (ADM Mullen, CJCS, 2010)**



# Questions