

Program Architecture and Adaptation

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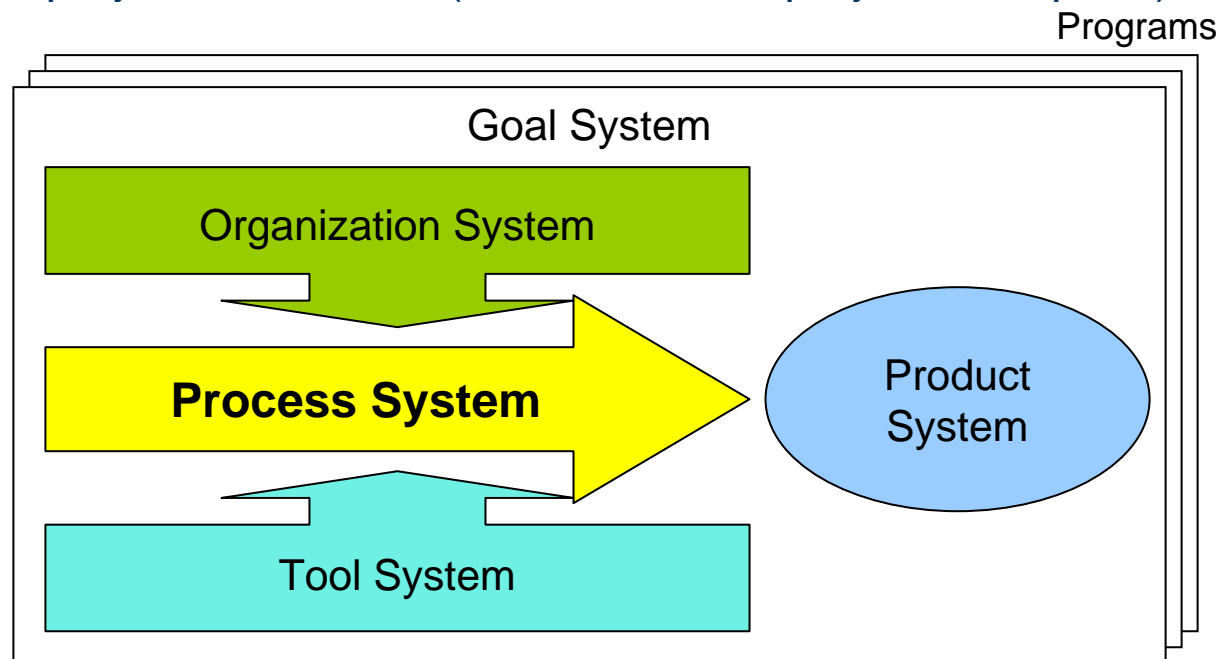
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Introduction

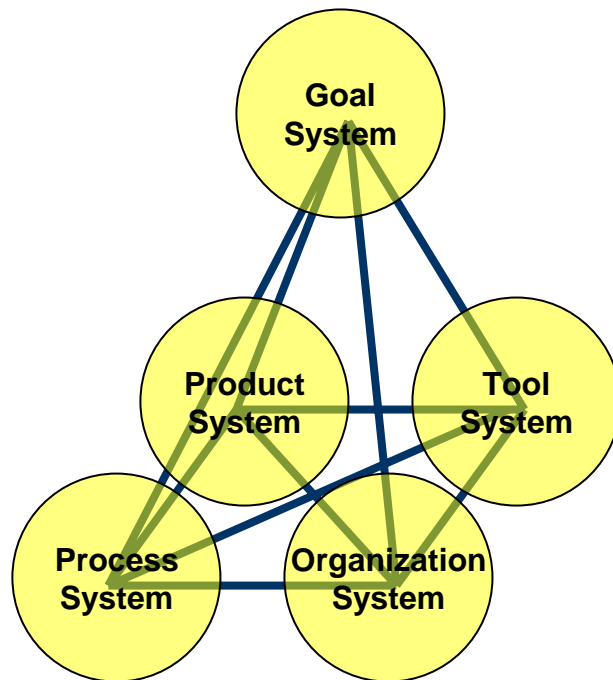
- Situation: Large, complex programs
- Result: information overload for managers
 - Filtering problems
- Need: to handle complexity, more quickly, through
 - Self-coordination and adaptation in the workforce
 - Better decision support models
 - Better information filters
 - Programs designed so that maximum value emerges

Five Program Systems or Domains

- Five systems, each with an architecture, together form a meta-architecture or program architecture.
- Most literature addresses only one of these five systems individually. Not surprising, since each is quite complex in its own right.
- But what may be optimal for each system individually may not be optimal for the project as a whole (or for the multi-project enterprise).



Capability “Molecule”



- Just as the properties of a molecule differ from those of its individual elements, so do the properties of a project differ from those of its individual systems.
- Using the same process, org, or tools on multiple projects does not guarantee that each will have the same outcome.
- Some of this variance comes from exogenous effects, while some comes from different interactions among the systems.

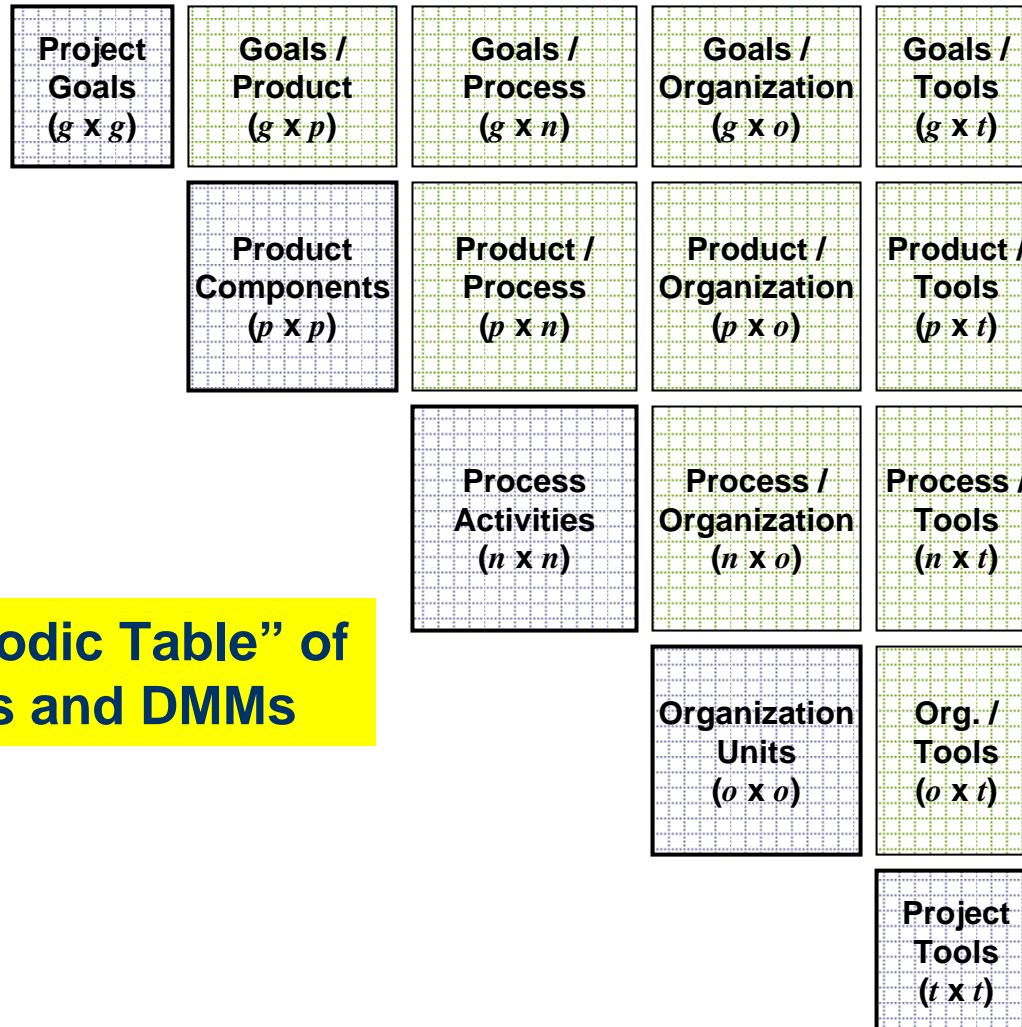
The Design Structure Matrix

	A	B	C	D	E	F	G	H	I
Element A	A								
Element B	•	B	•	•		•		•	•
Element C	•	•	C		•	•		•	•
Element D	•	•		D	•		•	•	•
Element E	•		•	•	E		•	•	•
Element F		•	•			F			
Element G				•	•		G		
Element H		•	•	•	•			H	
Element I	•		•		•				I

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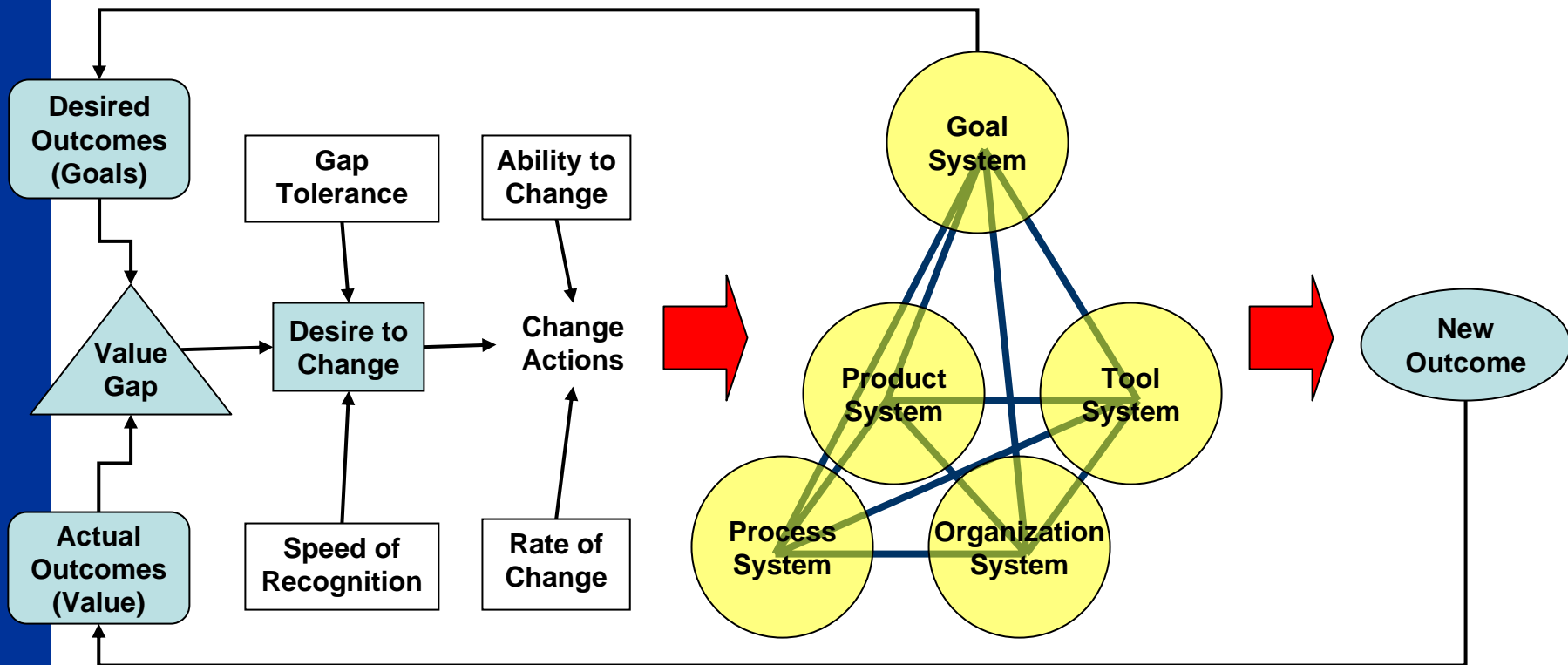
- A square matrix showing relationships between elements
- Shaded, diagonal squares represent the elements
- Off-diagonal marks represent a relationship
 - Read across a row to see where the element provides something
 - Read down a column to see where the element receives something

Program Architecture Framework

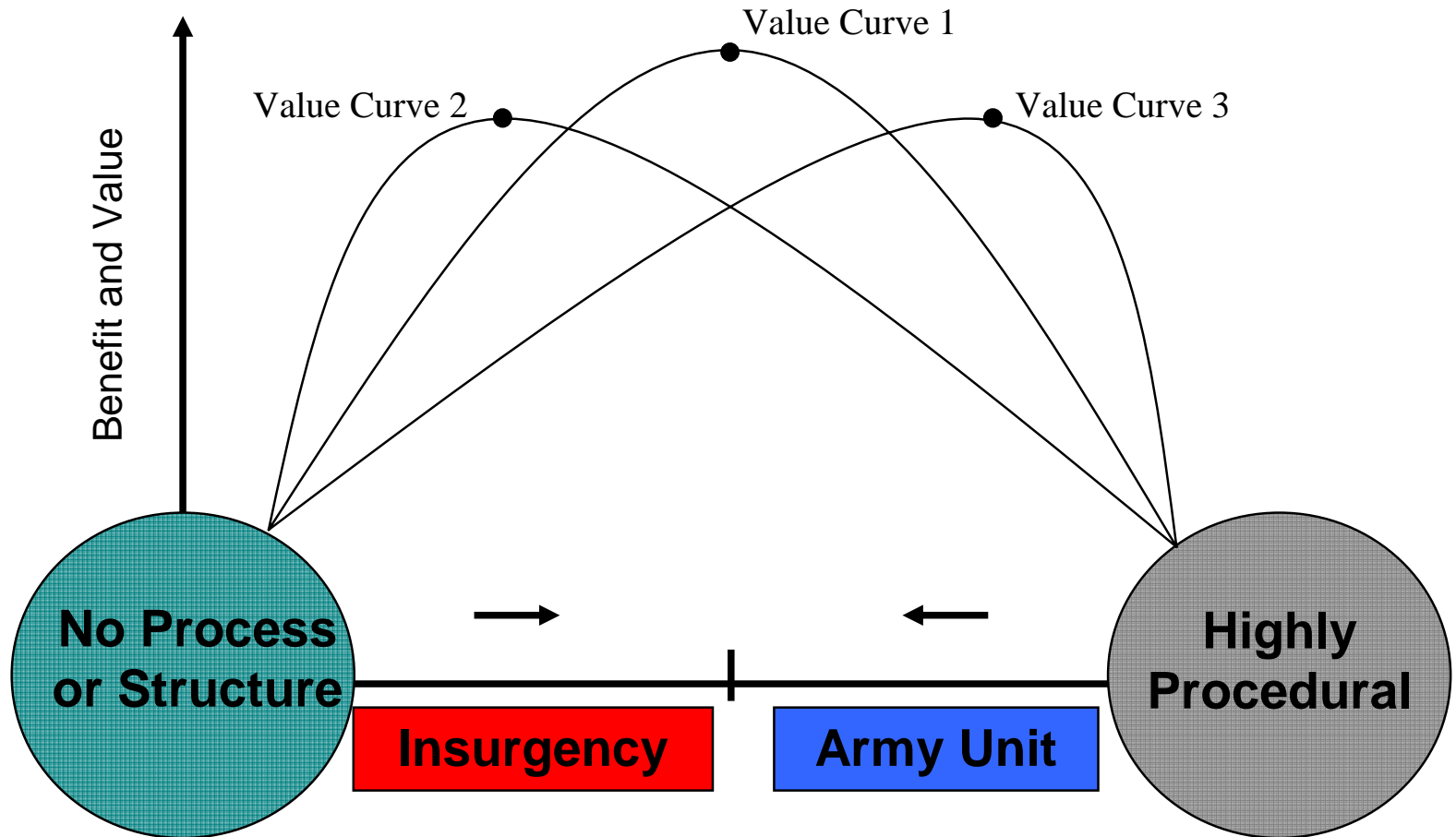


A “Periodic Table” of
DSMs and DMMs

Emergence Cycle



Value as a Function of Structure?



Two Pairs of Case Studies

Less Structured

Insurgency

Google

*Adapt by increasing
structure*

More Structured

US Army

Microsoft

*Adapt by decreasing
structure*

Army Adaptation Chart

	Before	Adaptation	After
Goals	Maintain stability in assigned sector, including Route Irish	Increased patrol presence, 24 hour operations on Route Irish	Maintain security and presence on Route Irish in particular
Product or Service	Relative stability within sector, but increasing attacks on Route Irish	Refined lines of operations, increase in patrols and presence	Attacks decreased immediately
Process	Maintain presence; set up random traffic control points; counter-mortar patrols; Route Irish presence part of natural patrol route	Increased combat power on route	Removing stopped vehicles; almost 90% of combat power on Route Irish; continuous patrol presence on route
Organization	Hierarchal, Vertical	Increased information sharing and flow	Increased network connectivity to troop command posts; improved information flow
Tools	Bradley Fighting Vehicles, M1 Abrams, Up-Armored HUMVEES	Improved systems to defeat IEDs	Increased capabilities, Warlock systems