The Coordination and Collaboration Process within Committees in the Information Age

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Motivation

- DoD Grappling with C2 and Organization Issues Especially In MIO Operations
- Teams In order To Collaborate form their own “Space Of Constraints” Whether They Act In The Physical, The Virtual Environment Or In Both
- Which Is The Dynamic, In Terms Of Time, Collaboration Process That Exists Within Committees With Fluidic Participation Which Operate In Both The virtual And Physical Environment?
Prior Research

• Team Research In General
  - Teams That Operate in the Physical Space (Such As Cliques by Poran & Sabastien, 1998; and Teams in General by Salas et. al., 1992) or Teams That Operate In the Virtual Space (Gibson & Cohen, 2003; Yoo, 2001) and Examined Coordination and Collaboration Within Committees Using the Majority Rule (Bordetsky, 1996; Miller & Page, 2007).
  - Teams’ Decomposition Applies When Complex Problems Arise (e.g. Swarm Groups as Proposed by Arquilla, J. & Ronfeldt, D, 2000).

• Current Campaign of Experimentation
  - TNT’s Series Of Experimentation (Souda Bay, Crete- San Francisco e.t.c)
Research design

- Collaboration Optimization in time path
- SD Theoretical model
- Feedback
- Field Experiments
- PSI Collaboration Optimization Model
Theoretical Model Basis
Interactions Among Supply Chain Partners
Theoretical Model Basis
Trust Building Cycle

- **Reinforce trusting attitudes**
- **Gain underpinnings for more ambitious collaboration**
- **Aim for realistic but successful outcomes**

- form expectations about the future of the collaboration based on reputation or past behavior or contracts and agreements
- have enough trust, be willing to be vulnerable and take a risk to initiate collaboration
Theoretical Model of Collaboration
Field Experimentation

- Field Experimentation With Participant From Nato Countries
- Hypothesis Testing:
  - Hypothesis 1: If Trust Among Members Of a Committee Increases, Then The Members Migrate From The Physical To The Virtual Environment More Often.
  - Hypothesis 2: Information Exchanges Faster When Members Migrate From The Physical To The Virtual Environment.
  - Hypothesis 3: The Need For Information Increases Among Members That Communicate In the Virtual Environment
Collaborative Process with Multi Criteria tool
(Adapted from Bordetsky (1996))

\[
\begin{align*}
\text{DM1} \\
\{[RL_{10}, AL_{10}] \}^T
\end{align*}
\]

\[
\max \{ c^T x = z_1 \}
\]

\[
\max \{ c^T x = z_2 \}
\]

\[
\vdots
\]

\[
\max \{ c^T x = z_p \}
\]

s.t. \( x \in s = \{ x \in \mathbb{R}^n ; Ax = b, x \geq 0, b \in \mathbb{R}^m \} \)

for each decision maker (DM), \( r = 1, \ldots, s \).

\[
\text{DM2} \\
\{[RL_{10}, AL_{10}] \}^T
\]

\[
\text{DMS} \\
\{[RL_{10}, AL_{10}] \}^T
\]
Conclusion

- A Theoretical Model Of Collaboration Is Generated Based On Literature. Building Upon Variables and Their Theoretical Derived Correlations a System Dynamics Model is Generated In Order To Examine The Collaboration Process In A Time Path.
- The Second Step Involves Field Experimentation To obtain The Coordination Process and The Factors That Affect Coordination.
- The Multivariate Nature Of This Problem Is Examined With The Parameter Space Investigation (PSI) Method of Multi-Criteria Optimization (Statnikov, 2002)
  - “Docking”
Questions?