A Q-Methodology Study Evaluating the Emergence of Complex Adaptive Systems in Organizations
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Abstract
The purpose of this study was to explore whether conditions within military organizations create a level of adaptive tension that leads to self-organization and the emergence of complex adaptive systems (CAS). The study’s findings suggest that there is a considerable amount of tension between the requirements and acquisition systems.

Relevant Literature
CAS theory has a foundation that can be traced back to general systems theory, through complexity and chaos theories, as well as cybernetics.

• The tension resulting from the clash of stovepipe systems may be one cause of emergence of a new adaptive structure.

Procedures
Design
• An exploratory, embedded case study

Sample
• In Q-Methodology, the sample is the statements to be sorted. 48 statements were sorted by 12 volunteers from three organizations.

Q-Methodology
• Each Service’s respondents were asked to perform a sort of the sample statements derived from the topics of organizational emergence, CAS theory, and cross-boundary integration.

Analysis of the respondents’ Q Sorts using the PQMethod software resulted in the correlation of the Q Sorts with each other, the identification of significant factors via principal components analysis, and a varimax rotation of those factors to understand which clusters of statements reflected trends in perceptions.

Findings
Analysis of the Q Sorts revealed six perspectives operant within individual organizations: Complexity Induced Tension, Tension Induced Stability, Complexity Induced Paralysis, Tension Induced Self-Organization, Synergistic Self-Organization, and Complex Adaptive Emergence.

The only combined system-level analysis concerned Army and Marine Corps requirements, and produced one perspective shared by members of both organizations - Complex Stability without Emergence.

One Service provided enough participants from the two different types of organizations to combine for a Service-level perspective. The single factor extracted from that dataset, Emergence from Chaos, provided the strongest evidence that JCIDS/DAS integration may produce an emergent complex adaptive system.

Limitations
Because the Marine Corps was the only Service to provide volunteers from both an acquisition and requirements organization, it was impossible to compare perceptions of CAS between Services. This outcome limited the answer to research question 3 to the results of a single Service perspective.

Further, only one system-level factor analysis was completed in support of research question two. Combining the Army and Marine Corps requirements participants enabled the extraction of a JCIDS-unique perspective, though without a DAS-unique perspective with which to compare it.

Conclusions
Almost all of the participants viewed the integration of their organizational processes as a permanent, and sometimes independent, structure.

In addition, most teams were characterized by high levels of interpersonal communication and stability.

The results provided some evidence of the emergence of complex adaptive systems within the Defense Acquisition Structure.

Social Change Implications
This particular application of CAS theory comes at a time when sequestration and other budget pressures demand that the DoD streamline and better integrate its processes. This research supports that effort.

Understanding how complex adaptive systems form facilitates the development of better policies to effectively integrate these systems, producing a greater return on America’s investment in its armed forces.

Research Questions
RQ1 - How do the Marine Corps and Army acquisitions and requirements workforce perceive the nature of their integrated systems?

RQ2 - How do perceptions regarding the emergence of complex adaptive systems, where the requirements and acquisitions systems integrate, differ between employees of the DAS and JCIDS organizations in each Service?

RQ3 - How do perceptions regarding the emergence of complex adaptive systems differ between Services with different organizational structures?

Data Analysis
Analysis of the respondents’ Q Sorts using the PQMethod software resulted in the correlation of the Q Sorts with each other, the identification of significant factors via principal components analysis, and a varimax rotation of those factors to understand which clusters of statements reflected trends in perceptions.

Purpose
The purpose of this mixed methods study was to explore whether different boundary and initial conditions within each Service creates adaptive tension that leads to self-organization and the emergence of a CAS at the junction of the two of the DoD’s systems.

Because empirical methods to test for the existence of a CAS were not found during the literature review, this study attempted to fill that gap using measures of workforce perceptions to search for commonality of experiences within and across the DAS and JCIDS organizations. Q Methodology uses quantitative techniques to test for common points of view among subjects.

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