2019-12

Enhance Warfighter Performance by Fostering Organizational Agility & Innovation in the Naval Research and Development Enterprise

Higgins, Sue L.; Brutzman, Don; Barrett, Frank; Gallenson, Ann

Monterey, California: Naval Postgraduate School

MONTEREY, CALIFORNIA

Enhance Warfighter Development by Fostering Innovation and Agility in the Naval Research and Development Enterprise

Period of Performance: 10/15/2018–10/14/2019

Researchers:
Principal Investigator (PI): CDR Susan Higgins, USN, Ret., Graduate School of Operational and Information Sciences (GSOIS), Information Sciences; Dr. Don Brutzman, GSOIS, Information Sciences Dept.

Additional Researcher(s): Ms. Ann Gallenson, Center for Executive Education; Dr. Erik Jansen, GSOIS, Information Sciences; Ms. Brittany Ramsey, GSOIS, Computer Science

Prepared for:
Topic Sponsor Lead Organization: DASN RDTE
Topic Sponsor Name: Dr. Dale Moore, DASN RDTE

NPS NRP Executive Summary

Enhance Warfighter Development by Fostering Innovation and
Agility in the Naval Research and Development Enterprise

Report Date: 10/14/19 | Project Number: NPS-19-N304-A

Naval Postgraduate School, Graduate School of Operational and Information Sciences

EXECUTIVE SUMMARY

Project Summary

The Chief of Naval Operations' (CNO) Design for Maritime Superiority identifies concerns about unprecedented and accelerating rates of change in maritime systems, global information systems, and technology. It highlights the need to reexamine approaches in every aspect of the Navy's operations. The National Defense Strategy is a clear call to action: accelerate the delivery of technology to the warfighter. To this end, Naval leaders are calling for increased organizational agility across the Navy bureaucracy. In support of these calls, our work explored how the Naval Research and Development Establishment (NR&DE), including a key organizational stakeholder, might increase organizational innovation and agility in an environment that is increasingly volatile, uncertain, complex and exponentially accelerating (E-VUCA).

The following questions guided this research:

- How can NR&DE leaders foster organizational and individual capacity for agility and innovation such that its workforce can adapt to an E-VUCA environment to ensure the Navy's warfighting superiority?
- What are the cultural and organizational implications across the NR&DE of accelerating rates of technological change?
- How might agile teams and intrapreneurship opportunities contribute to expanding innovation and agility in the NR&DE?

In answering these questions, we built on previous research. With Commander, Operational Test & Evaluation Force (COTF), a key stakeholder of the NR&DE, we explored ways to improve their organizational capacity for agility and innovation. We considered how the NR&DE, which is comprised of the Naval Warfare Centers and Labs, and stakeholders might leverage existing resources at Naval Postgraduate School (NPS) to improve capacity for organizational agility and innovation. We collaborated on design, development and delivery of a multi-day workshop on complex adaptive systems at the NR&DE Naval Surface Warfare Center, Carderock Division.

Our results, captured in a white paper and technical research report, indicated that because agile practices are not appropriate for all work, it is important to assess when they should be used. Our white paper provides lessons from industry leaders, including that leaders should understand modifying roles, as opposed to structural change, can promote the collaboration needed by agile development processes. Additionally, implementation of agile goals can depend on leaders' ability and willingness to be agile themselves, instead of relying on traditional methods of control. This calls for leaders to cultivate an increased tolerance for risk and ambiguity as teams throughout the RDT&E environment when agile processes are employed, and continuous learning must be valued and rewarded.

NPS NRP Executive Summary

Enhance Warfighter Development by Fostering Innovation and
Agility in the Naval Research and Development Enterprise

Report Date: 10/14/19 | Project Number: NPS-19-N304-A

Naval Postgraduate School, Graduate School of Operational and Information Sciences

Keywords: *Naval Research and Development Establishment (NR&DE), agility, innovation, agile processes, agile organizations*

Background

In a recent Naval Institute Proceedings article, retired U.S. Marine Corps General John Allen describes a hypothetical "hyperwar" scenario in which a guided-missile destroyer is confronted with cyberattacks driven by artificial intelligence (AI) and waves of swarming autonomous systems, which overwhelm the crew by reducing decision times to seconds, while devastating the ship in minutes (Allen & Husain, 2017). This scenario is conceivable because of the confluence of four rapidly changing technologies: cloud computing, AI, big data and internet of things. Former U.S. Secretary of Defense Robert Gates views this confluence as an "existential threat" that should both alarm leaders and be viewed as "an historic opportunity" for changing the Navy's efforts in research, development, test and evaluation (RDT&E) of future weapon systems. The calls by the CNO and other Navy leaders to increase the Navy's capacity for agility and innovation are rooted in this and similar plausible scenarios.

However, declarations by senior leaders to increase the Navy's agility alone do not lead to necessary change; transforming large organizations is a complicated process. Leaders must align strategy, organizational structures, tasks, practices, training, education, informal continuous learning, rewards, and incentives, all while considering interdependencies across these categories.

Our previous work discussed organizational culture as revealed to leaders and members of organizations by shared assumptions that emerge largely, although not entirely, in response to leadership actions that impact policies and actions in five domains: (1) strategies and goals, (2) structures, (3) practices and technologies, (4) training and education and (5) reward systems and incentives. Organizational culture emerges out of the sensemaking of individual interactions in response to leadership's communications and "sense-giving." Thus, leaders shape, but do not control, culture. Therefore, attempting to induce culture change through partial, non-systemic efforts may produce limited compliance, but it is unlikely to generate the deeper commitments required for lasting changes in values and norms. Building on this work, we explored what leaders should consider as they attempt to shape an agile and innovative naval culture.

Findings and Conclusions

Our white paper reviews business cases of corporate exemplars for agile practices and assessments, particularly in large organizations that confront the challenges of bureaucracy. It includes an action plan that provides considerations for leaders who are attempting to shape an agile and innovative naval culture. The paper also cautions leaders implementing agile approaches that: (1) Not all work is appropriate for agile methods; (2) Large complex organizations can have both agile teams and traditional units; (3) Implementing agile goals is unlikely to be successful if leaders use traditional methods of hierarchical control and formalized planning; (4) Leaders should consider changing roles rather than structures to promote the cross-functional collaboration needed when employing agile methods.

Navy experiments leveraging other transactional authorities have also been identified to potentially catalyze innovation and increase the agility in some areas of the NR&DE. For example, Naval Innovation in Science and Engineering (NISE) funding is helping to increase research on rapid prototype development, experimentation and demonstration across the NR&DE (National Defense Authorization Act for Fiscal Year 2017, 2016). Additionally, the recently formed Naval-X, a small team that reports to the Assistant Secretary of the Navy for Research, Development and Acquisition, serves as a Department of Navy (DON) workforce "super-connector," focused on scaling non-traditional agility methods across the DON workforce.

Lastly, a challenge facing the Warfare Centers and Labs which comprise the NR&DE and its stakeholder COTF, is the inclusion of the customer's "voice" early and often into RDT&E processes, a necessity when agile methods are employed. COTF has recognized that NPS students will be the operational customers of the systems the students test and evaluate. A follow-on Naval Research Program project with COTF will explore bringing NPS students-as-customers onto projects earlier and more often than has previously occurred.

Recommendations for Future Research

There are several areas for future research, including developing an Organizational Agility Maturity Model appropriate for the NR&DE, building capacity within NR&DE to develop agile mindset and apply agile practices when appropriate by developing workshops, courses, and certificates, for Science, Technology and Engineering and Math workforce to learn about agile methods and their application to programs and projects within the NR&DE, and increasing the leverage of NPS research, experimentation, and learning venues by NR&DE organizations.

References

Allen, J.R., & Husain, A. (2017). On Hyperwar. *Proceedings of US Naval Institute Proceedings,* Vol: 143 (pp. 1373).

National Defense Authorization Act for Fiscal Year 2017, Pub. L. No. 114-328 Stat. 2000 (2016). Retrieved from https://www.congress.gov/114/plaws/publ328/PLAW-114publ328.pdf

Acronyms

AI	artificial intelligence
DON	Department of Navy
COTF	Commander, Naval Operational and Test Force
E-VUCA	volatile, uncertain, complex and exponentially accelerating
NISE	Naval Innovation in Science and Engineering
NPS	Naval Postgraduate School
NR&DE	Naval Research and Development Establishment
RDT&E	research, development, test and evaluation