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Mapping and Analyzing NSW Blue Network to Leverage Insights for a Competitive World

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Monterey, California: Naval Postgraduate School

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NPS NRP Executive Summary

Mapping and Analyzing NAVSPECWARCOM's Blue Network
to Leverage Insights for a Competitive World

Period of Performance: 09/16/2020 – 10/22/2021

Report Date: 10/21/2021 | Project Number: NPS-21-N113-B

Naval Postgraduate School, Graduate School of Operational and Information Sciences (GSOIS)



NAVAL RESEARCH PROGRAM
NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MAPPING AND ANALYZING NAVSPECWARCOM'S BLUE
NETWORK TO LEVERAGE INSIGHTS FOR A COMPETITIVE
WORLD

EXECUTIVE SUMMARY

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Student Participation: No students participated in this research project.

Prepared for:

Topic Sponsor Lead Organization: N9 - Warfare Systems

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Project Summary

This study's purpose is to examine Naval Special Warfare Command's (NAVSPECWARCOM) "blue network" and evaluate its structural strengths and weaknesses, as well as provide recommendations as to how the command can improve its ability to leverage its network and draw insights from it. This paper examines this topic from a social network perspective on social capital. Guided by extant social network research, it maps and analyzes the network's structural patterns and assesses the extent to which it has access to critical resources and expertise from outside networks (e.g., academic and private industry).

It finds that both close personal and colleague relations contribute substantially to regular communication patterns among personnel. Blue network members tend to form communication clusters as well, which can permit information and resources to transmit efficiently across them, especially in its relatively decentralized form. In fact, the command can rely on *many* network members to gain access to capital within the structure rather than depend heavily on a few well-connected individuals. However, about a quarter of respondents do not communicate regularly with the command, which indicates that capital may not reach the command. Furthermore, the type of capital to which the network has access varies. While it appears relatively strong in technology-based areas (e.g., innovation and artificial intelligence [AI]), it can make improvements in key substantive areas pertaining to great power competition (GPC), such as cultural and language expertise.

This paper offers two broad categories of recommendations: namely, practices and information collection and storage procedures. Recommendations include maintaining an entrepreneurial mentality but improving formal communication, facilitating the creation of "short-cuts" among affiliated institutions, tasking personnel to target key resource gaps, immediately establishing contacts with experts in key areas, collecting blue network and resource data, and leveraging information systems for information storage.

Keywords: *Naval Special Warfare Command, NAVSPECWARCOM, social network analysis, SNA, social capital, blue networks, resource generators, exponential random graph models, ERGMs, great power competition, GPC, informal networks, multilevel networks, social processes, emerging technologies.*

Background

Because it is critical for NAVSPECWARCOM to maintain a comparative advantage with foreign adversaries in key topics, such as strategic competition, advanced technologies (e.g., AI and robotics), and other subject-matter domains (e.g., culture awareness in key countries, foreign languages, and licit and illicit social networks), it needs to understand itself and assess the extent to which it is acquiring knowledge and resources from experts in key domains. This analysis provides the command with a better understanding of its "blue network's" layout, much like a topographical map in any operating environment, and offers a glimpse into how personnel interact and communicate with one another. Moreover, it identifies the resources and expertise to which the blue network has substantial access, as



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well as highlights gaps in its knowledge base, to help the command allocate personnel to reach its goals of operating effectively in future operating environments.

This paper takes a social network perspective on social capital and seeks to identify the social processes – the ways by which ties form – that underly the blue network's communication patterns. It leverages complete roster social network questionnaires that capture multiplex data (i.e., communication, personal, and colleague) among blue network personnel. It administers a second questionnaire to collect data about personnel's access to non-NAVSPECWARCOM individuals (e.g., private sector and academia) who could offer capital to support the command. Following Van Der Gaag and Snijders' (2005) work on "Resource Generators," this paper outlined sixty-seven resource items that the command thought were desirable to meet its objectives.

Our analysis draws on both descriptive statistics and social network models to examine how the blue network functions and formed in terms of social capital. An important aspect of social capital pertains to one's level of analysis. Consequently, it tested several hypotheses pertaining to several prominent theoretical mechanisms about tie formation that can occur at the individual and cluster levels, as well as between multiple types of ties (e.g., colleague and communication ties). To test the hypotheses, this paper leveraged exponential random graph models (ERGMs) to model social processes underlying NAVSPECWARCOM's *communication* network. This model class offer researchers a means to examine various multilevel social processes that help give rise to a network's observed patterns at the macro level (Lusher et al., 2013; Monge & Contractor, 2003; Robins, 2015).

Findings and Conclusions

This paper uncovered empirical support for several, but not all, of the hypotheses. Using ERGMs, it found that blue network personnel tend to form communication clusters that can permit information and resources to transmit efficiently across them, especially in a decentralized form. Also, it discovered that hubs do not dominate the network, which suggests the command can rely on *many* individuals to gain access to capital within the structure rather than depend on a few well-connected individuals. In general, it appears that personnel are well-connected with many other blue network members with whom they can share information and resources. However, only 79% of the respondents communicate with their command on a weekly or monthly basis, which indicates that while capital *could* flow among personnel in an informal manner, it may not always reach the command level in a formal, systematic way.

Additionally, this analysis found that both personal and colleague relations contribute substantially to regular communication patterns among personnel. As extant literature demonstrates, understanding informal relations like these can offer valuable insight into an organization and its ability to acquire capital (Eisenberg et al., 2015; Krackhardt & Hanson, 1993; Kratzer et al., 2005; Molina-Morales & Martinez-Fernandez, 2010; Obstfeld, 2005; Romzek et al., 2012). While it is possible that



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NAVSPECWARCOM collects and stores information about who served with whom (i.e., colleagues), it is likely unaware of the role that personal ties, which can include friendships that take place outside of official business, play in the formation of communication interactions that it can leverage for capital and meet its objectives. Similarly, this analysis found that being co-located at the same type of institution can improve the chances that individuals will communicate.

While the blue network may possess advantageous structural properties, the type of capital to which it may have access varies depending on the topic. Based on the available data, the blue network is relatively strong in areas pertaining to technology-based activities, such as innovation, AI, unmanned systems, and access to technology hubs like Silicon Valley. However, the blue network lacks potential access to capital in many key substantive areas pertaining to GPC for which it should account in the future, including issues pertaining to shifting geopolitical, socio-economic (e.g., instability and shifting demographics), and technological (e.g., biometrics) trends, as well as the convergence of “future trends” (e.g., extremism, nation-states, changing battlefield) (Mattis, 2018; United States Special Operations Command (USSOCOM), 2019).

This paper offers two broad categories of recommendations: namely, practices and information collection and storage procedures. Recommendations include maintaining entrepreneurial mentality but improving formal communication, facilitating the creation of “short-cuts” among affiliated institutions, tasking personnel to target key resource gaps, immediately establishing contacts with experts in key areas, collecting blue network and resource data, and leveraging information systems for information storage.

Recommendations for Further Research

This analysis provides a useful, yet static, depiction of Naval Special Warfare Command's (NAVSPECWARCOM) blue network. The command should consider regularly and systematically collecting information about relationships among blue network personnel and their external contacts. Some data is relatively straightforward to capture, such as communication ties and personnel who worked closely at previous deployments (e.g., colleagues), whereas other data is a bit more intrusive and may have to be voluntary (e.g., personal ties). While this analysis leveraged questionnaires, the command could consider analyzing email exchanges (i.e., not content but who emails whom) to understand regular communication among personnel. Regardless of the approach, it is important to consider multiple types of relations because some ties, like “personal” and “colleagues” in this study, may help explain the formation of others (e.g., communication). By collecting both network and resource data regularly, the command can understand more effectively its informal blue network and its ability to acquire capital even as personnel move from one position to another.

Future social network research on blue network mapping should consider addressing social capital in at least two other contexts. The first is to expand research into include the broader U.S. Navy social system



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in which personnel seek to enhance the branch's ability to access resources and expertise. Identifying relationships between key Naval commands engaged with one another can enable a branch-wide efforts to address issues pertaining to great power competition (GPC). The second context is to map and analyze relations among the branches' in joint settings in which access to resources and expertise are key, particularly within a GPC and "future operating environment" contexts.

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Acronyms

| | |
|---------------|--------------------------------|
| AI | Artificial Intelligence |
| ERGM | Exponential Random Graph Model |
| GPC | Great Power Competition |
| NAVSPECWARCOM | Naval Special Warfare Command |

