al-Qaeda: Study of Decentralized Organization

Nicole Hutchison, Art Pyster

Stevens Institute of Technology
1 Castle Point on Hudson, Hoboken NJ
nicole.hutchison@anser.org

Abstract

Despite efforts by the U.S. an its allies to debilitate the al-Qaeda organization in the eight years since the September 11th terrorist attacks, al-Qaeda continues to operate and poses a national security threat to the U.S. Recent research indicates that part of al-Qaeda's success hinges upon the organization's ability to function in a decentralized manner. This paper analyzes al-Qaeda using the principles of decentralization and discusses potential connections between their decentralization and their ability to survive in a hostile environment. It is the hope of the authors that follow-on work may provide insights into potential weaknesses of al-Qaeda as well as potential counter-measures to defense the U.S. from further terrorist attacks by the organization.

Introduction

Almost eight years after the U.S. invasions of Afghanistan and Iraq, al-Qaeda still poses a serious threat to U.S. national security. Since the 9/11 terrorist attacks, the U.S. has targeted al-Qaeda both politically and militarily. But though there have been many successful operations and many "high value" targets have been captured or killed, al-Qaeda continues to survive and, in some areas of the world, thrive. It is the tenets of the authors that this survival despite Global War on Terror

(GWOT) efforts is due, in part to the organization's decentralization.

This paper will discuss the elements of al-Qaeda which exhibit decentralized principles and how those principles appear to relate to the organization's ability to survive in a hostile environment. By improving insight into al-Qaeda's decentralization, the authors hope to provide areas of interest or potential countermeasures which may be useful for exploitation by the U.S. and its allies.

The authors would like to note that initial work on this subject stems from the masters thesis efforts of Fekecs et. al.[1]

A Systems Approach to al-Qaeda

This document describes the results of applying soft systems methods, concepts, principles, and thinking to a social network. This contributed to gaining insight into al-Qaeda's extended enterprise and what makes it agile; specifically, how it continues to operate and seemingly grow despite GWOT efforts. The results include insights into the relationship between decentralization and agility as well as a discussion of al-Qaeda'.

The response ability of key functional components for al-Qaeda – ideology, leadership, communication, recruiting, training, operations, and finance – were a focus of the research and analysis to determine

---

[1] Fekecs, R.; Hutchison, N.; Petersen, P.; Powell, T.. "Agility of the al-Qaeda Enterprise: A Systems Approach", Master's Thesis, Stevens Institute of Technology, December 2008.

their contribution to agility. The team concluded that al-Qaeda has evolved into an agile organization at least in part as a result of GWOT efforts. When GWOT efforts focused on disabling the key functional components of al-Qaeda's resilience, the result was that the network became self-organized at the lowest level to survive these disruptions. Further, the team concluded that the core of al-Qaeda's agility is the ideology of radical Islamic fundamentalism.

This document also addresses how soft systems methods and systems engineering, dynamics, and thinking tools were utilized to define, analyze, and characterize al-Qaeda. The team used examples of how these tools were used and applied them to al-Qaeda—a soft system comprised primarily of people and processes—instead of a traditional hardware/software system. These tools facilitated identification and analysis of discrete components within the system. This focus enabled better characterization of the agility of functional components, and in understanding al-Qaeda as a self-organizing system-of-systems.

Methodology

The team's initial analysis used systems engineering tools to characterize and develop an understanding of al-Qaeda as an agile system; these tools provide useful insights at specific points in time. However, a soft system of systems is, by nature, constantly evolving; therefore, understanding the changes over time are critical to characterizing the organization. Because the initial analytical approach did not account for this, the team looked to systems dynamics tools to supplement the knowledge gained from systems engineering tools and provide insights into organizational evolution. Therefore, an array of systems tools was required to fully understand this complex, self-organizing system-of-systems.

To analyze and characterize the decentralized aspects of the al-Qaeda enterprise, the team used several systems engineering and analysis tools and techniques; most notably Peter Checkland's soft systems methodology,[2] Rick Dove's agile systems response ability[3], and John Boardman's systemigram mapping technique,[4] and extended enterprise principles.[5] These tools and analysis techniques helped define the agile components of the al-Qaeda extended enterprise for focused analysis. They also provided processes to evaluate the role of al-Qaeda's decentralized network structure on its agility and how they have adapted over time. With this enhanced understanding, analysts might better project the future of this enterprise and focus counter-terrorism efforts on their less agile components.

To gain insight into al-Qaeda's agility, the team's initial efforts focused on gaining a picture of the as-is of al-Qaeda as a resilient organization (which may constitute the "problem" from the perspective of the United States). Though popular media sources produce numerous reports on the organization and their activities, the team primarily developed the as-is through first-hand accounts of researchers, including Gunaratna[6]

---

[2] Peter Checkland, Systems Thinking, Systems Practice, John Wiley & Sons, Inc., New York, 1999.

[3] Rick Dove, *Response Ability: The Language, Structure, and Culture of the Agile Enterprise*, John Wiley and Sons, Inc., New York, NY 2001.

[4] Charles Blair, John Boardman, Brian Sauser. (2007). "Communicating Strategic Intent with Systemigrams: Addressing the Network-Enabled Challenge." Journal of Systems Engineering. 10(4):309-322.

[5] John Boardman, "Architecting the Extended Enterprise," Stevens Institute of Technology, Systems Design and Operational Effectiveness Program, course number SDOE 679, lecture materials, delivered Oct-Dec 2007.

[6] Rohan Gunaratna, *Inside al-Qaeda—Global Network of Terror*, Berkley Books, New York NY, 2002.

Burke,[7] and Sageman[8] as well as sources produced by al-Qaeda, such as their manifesto.[9] This picture of the as-is includes not only the structure of the organization but also tactics, strategies, and ideology.

The team then explored al-Qaeda through a systems "lens"—in other words, it began applying systems engineering and thinking concepts to the enterprise and used this perspective as the "lens" through which to study and understand the organization. During the course of these analyses, each type of tool provided a unique perspective of the organization.

Al-Qaeda – Centralized or Decentralized?

Modern terrorist organizations tend to function as distributed networks; this makes them better able to survive than if they were organized in a hierarchical fashion. While initial U.S. actions in the GWOT had a significant impact on al-Qaeda, it remains a resilient organization.[10] For example, the autonomous cells and individuals drawing on advanced technologies and the tools of globalization combined with the motivation to commit a terrorist act now represent "micro-actors" who are extremely difficult to detect or counter. A concept presented by Ori Brafman and Rod Beckstrom in their book, *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations,[11]* presents a theory to explain this phenomenon.

In their book, Brafman and Beckstrom compare centralized organizations and decentralized organizations. They assert that decentralized organizations are based on completely different principles than traditional centralized organizations and tend to organize around a shared ideology; they arise rapidly around the simplest ideas that can then be easily duplicated. Once organizations such as al-Qaeda arrive, they can be massively disruptive and a very powerful force to deal with. Centralized organizations, such as the U.S. government, have clear structure; therefore, it is feasible to develop strategies and tactics to defeat this force.

Even with a focused effort by the U.S. and its allies to detect and destroy al-Qaeda, they continue to pose a threat against Western societies. The organization is built around a central ideology; Al-Qaeda that promotes unity among Muslims to take action against non-Muslims. Al-Qaeda uses operations, recruiting, and training activities to create empathy and confidence in the justice being pursued by the organization and to build allies in order to generate a permissible operating environment. They remain agile through adaptive processes and procedures and by using innovative tactics to exploit technology. Another key component of al-Qaeda's agility is their ability to communicate their message, be it operational directives or a call to the cause. (See Figure 1)

In addition to this, the original team reviewed the 10 principles of decentralization presented by Brafman and Beckstrom and made the following observations regarding al-Qaeda's decentralization:

[7] Jason Burke, *Al-Qaeda: The True Story of Radical Islam*, I.B. Tauris, London, England, 2006.

[8] Marc Sageman, *Understanding Terror Networks*, University of Pennsylvania Press, Philadelphia, PA, 2004.

[9] Walter Laqueur, *Voices of Terror: Manifestos, Writings, and Manuals of al-Qaeda, Hamas, and Other Terrorists from Around the World and Throughout the Ages*, Reed Press, New York, NY, 2004.

[10] McMahon, Capital Interview: Al-Qaeda Crippled But Resilient, August 21, 2006

[11] Ori Brafman and Rod Beckstrom, *The Starfish and the Spider: The Unstoppable Power of Leaderless*

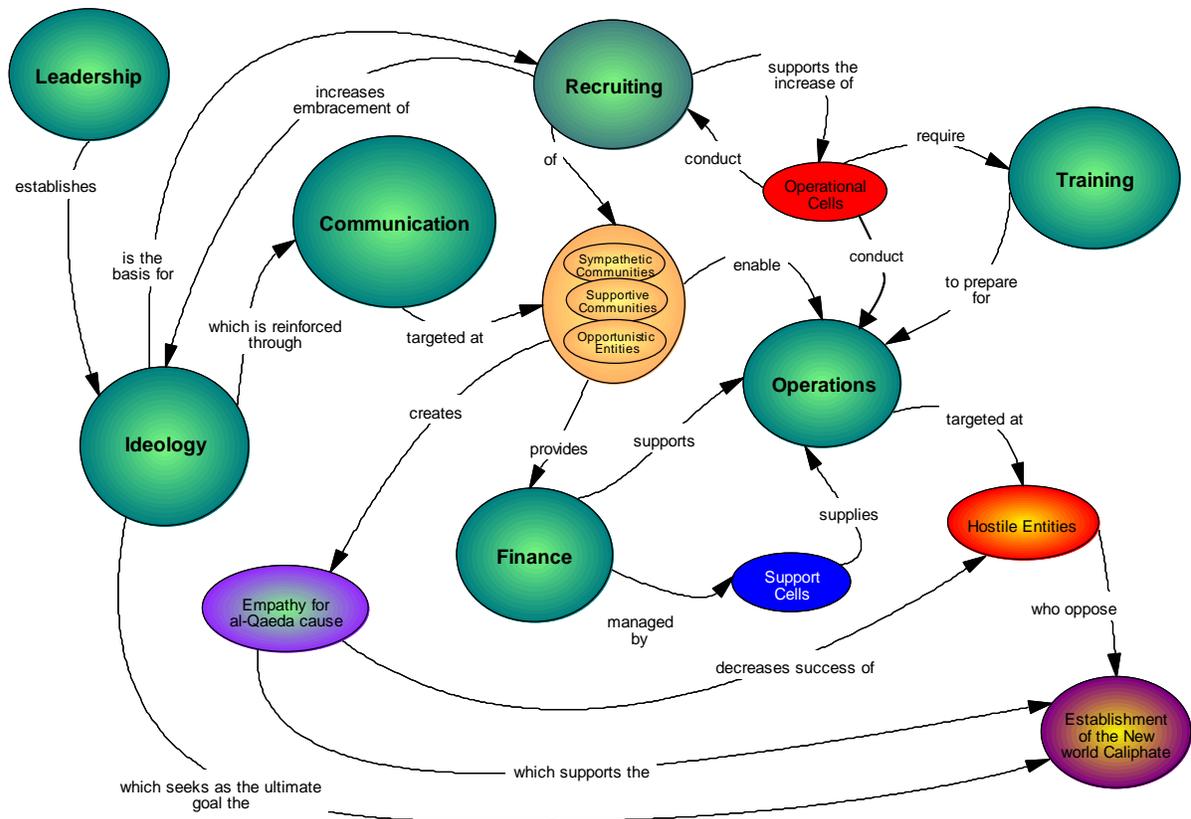*Organizations*. New York, NY, Penguin Books Ltd., 2006.

Figure 1. View of al-Qaeda processes which highlight the core functional areas for organizational activity

- Although Osama bin Laden is commonly thought to be the leader of al-Qaeda, in reality there is no one in charge of this organization. He is attributed with providing the fundamental ideology, as well as, the operating goals and objectives for this organization. However, it would not be possible to track an operational cell to him through an organizational structure.

- It is unlikely an operational cell leader knows the physical location of the al-Qaeda senior leadership and a headquarters is not integral in the ability of an operational cell to exist or perform their mission. In fact, most cells have multiple safe houses and may exhibit the proactive security strategy of using, gaining, or cutting ties with individual safe houses at random.

- A number of key leaders within al-Qaeda have been captured or killed. They have been quickly replaced with little impact to the overall presence of the terrorist group or their perceived threat in the environment in which they are operating. In fact, there is evidence that removing leaders (a hostile action designed to hurt the organization) actually facilitates increased decentralization and makes al-Qaeda a more difficult organization to fight.

- The division of roles within the al-Qaeda is not clear – some are overlapping and often times they are unknown even within an operational cell. There is some level of delineation and some individuals are dedicated to specific tasks. However, individuals generally can move between roles.

- Numerous terrorist cells have been targeted and destroyed in the GWOT, but al-Qaeda continues to operate and seemingly grow.
- When al-Qaeda performs operations in clandestine conditions, knowledge and power are distributed in order to protect it from getting into the hands of those most interested in gaining information and reducing the organizational presence. Tactics and ideology are often pushed to the edges—provided online and in person to any receptive individuals.
- Al-Qaeda is very flexible – it continues to adapt and modify tactics in response to GWOT efforts. They are rapidly able to adapt tactics to counter American counter-tactics (e.g. placement of IEDs changes to defeat American counter tactics, even when counter-tactics are seen in completely different locations—distributed information allows maximum flexibility).
- In open sources, the definition of al-Qaeda is unclear. If you were to do an internet search on the number of al-Qaeda members, what would return would be a vast difference in estimated numbers, ranging from as few as 300[12] to as many as 50,000.[13]
- Most individuals coordinate directly, however there are sometimes intermediaries for security reasons. It is not a chain-of-command issue, rather a method to protect identities and some aspect of the mission.

---

[12] Jason Burke, *Al-Qaeda: The True Story of Radical Islam*, I.B. Tauris, London, England, 2006.
[13] Memorial Institute for the Prevention of Terrorism (MIPT), *Terrorism Knowledge Base*, "al-Qaeda" Group Profile, available at
http://www.tkb.org/Group.jsp?groupID=6, accessed Jan. 14, 2008.

Al-Qaeda is a complex enterprise and is adept at responding to environmental factors (both threats and opportunities). It has repeatedly self-modifies/self-corrected when necessary, conducted operations at a local level, and created an ideology to harness collective action. In *Starfish and the Spider*, Brafman and Beckstrom assert that the absence of structure, leadership, and formal organization, traditionally considered an organizational weakness, has become a major asset.[14] Al-Qaeda's ideology is strengthened by the fear that Westerners are threatening the fabric of Muslim civilization.

Decentralization and Agility

Decentralization plays a key role in, but is not solely responsible for, al-Qaeda's agility. There is clear overlap between the characteristics of decentralization and those which make the organization agile. Both drive information and power to the lowest level possible, and in each, all nodes are connected by some common framework—be it a hard infrastructure or a uniting ideology. However, there is an important distinction between the two.

Agility connotes organizational action—either proactive or reactive—which effects change within the environment. The types of actions taken and the methods used to enable those actions are important elements in agility. Decentralization, however, is an organizational framework which does not dictate the types of actions an organization will utilize or the methods best suited to those actions.

Al-Qaeda is a self-organizing system-of-systems; components within the system enable appropriate configuration and reorganization in response to environmental stimuli. These types of actions are typical of an agile organization, but are not implied merely by a

---

14 Ori Brafman and Rod Beckstrom, The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations. New York, NY, Penguin Books Ltd., 2006, p.7.

decentralized structure. In the reorganization and reconfiguration of al-Qaeda, components are reused in new and innovative ways and decisions are not made until warranted by the environment. These characteristics of plug capability and deferred commitment contribute to al-Qaeda's agility, but again, are not attributable to decentralization alone.

Based on the team's research, al-Qaeda is an agile enterprise. At the core of al-Qaeda's agility is the ideology of radical Islamic fundamentalism which provides the banner around which people rally. When the basic tenets of a thought or idea fundamentally remain the same, the strategies and processes of an agile organization will change in order to meet the challenges of the current environment while maintaining that ideal. The evolution of al-Qaeda into a highly-decentralized organization took place following the September 11th attacks. GWOT efforts to target al-Qaeda's funding, leadership, training, and communications were designed to weaken the organization. Though initially successful, they have had the opposite effect over time. The unexpected result of these actions was that over time the al-Qaeda network became self-organized from the lowest level in order to survive despite these disruptions.

Without a strong foundation, the organization could easily have been disbanded under such hostile conditions. However, because al-Qaeda was founded on a shared vision, it fought to preserve its organizational identity. The methods used to recover from these disruptions were to increase the distribution of power, information, and operations. This enabled al-Qaeda to shift from a regional group of recognized individuals focused on local enemies to a global force of indeterminate number focused on enemies throughout the world. Al-Qaeda was even able to use the GWOT actions against their organization to reinforce their position within the Muslim community.

Developing a solution to deal with this nebulous enterprise will be a major challenge to future GWOT efforts.

Observations

The following are the primary observations with regards to al-Qaeda's decentralization:

- Al-Qaeda contains many distributed cells with local-level leadership, which are decentralized and autonomous. However, al-Qaeda's core group is the least agile aspect of the organization in that it has a hierarchical structure that can be defined and its members are readily identified.
- Al-Qaeda displays self-organizing system of systems attributes in its recruiting and is bound only by ideology; leads to decentralized, complex, self-adapting processes without guidance or management from outside sources.
- Training is conducted in a decentralized, *ad hoc* fashion, often using virtual resources; this reduces funding requirements and susceptibility of members as targets in GWOT as well as the added benefit of reaching a wider audience.
- As an initial key target in the GWOT, al-Qaeda evolved from the use of organized training at training camps, to a more decentralized, *ad-hoc* approach.

Way Ahead

As a follow-up to this initial work, the authors are currently scheduling interviews with subject matter experts (SMEs) employed in the U.S. Department of Defense as well as defense organizations of allied countries. These interviews will serve three purposes:

1. To independently verify the initial findings;
2. To update findings with current information; and
3. To determine whether this view of al-Qaeda may also be applicable to other extremist groups in the Middle East.

The interviews will consist of two-stages of interaction. First, a questionnaire will be sent to all interviewees, who will be asked to review the questionnaire and write a few bullets for discussion on each question. Then the team will conduct a follow-up interview to discuss the key points from the SME's perspective and clarify any possible points of confusion.

Acknowledgements

As previously mentioned, the starting point for this work was a master's thesis project conducted at Stevens Institute of Technology and submitted in December 2008. The authors wish to thank to the other members of this thesis team: Trina Powell, Paul Petersen, and Richard Fekecs. The authors would also like to thank Vince Tur-Rojas, who provided guidance on al-Qaeda's organization early in the project. Finally, the thesis work was funded by Analytic Services Inc. (ANSER); the authors would like to thank ANSER for their support and dedication to the advancement of systems engineering.

Bibliography

Rich, Elaine, *Artificial Intelligence*. McGraw-Hill, New York, 1983.

Stillman, J.P., "On Heuristics for Finding Loop Cutsets in Multiply Connected Belief Networks." Technical Report, General Electric Research and Development Centre, September, 1989.

Schweiter, G.A. and Stromquist, W.R., "The Effect of Sensor Quality on Tracker/Correlator Performance." *Technical Proceedings of the 1990 Joint Service Data Fusion Symposium* (Laurel, MD, May 15-18, 1990). Naval Air Development Center, Warminster, PA, pp 197-222.

Biography

Nicole Hutchison is an analyst for Analytic Services, Inc., Arlington, VA, providing systems and research analysis for the Departments of Defense, Homeland Security, Justice, and Health and Human Services. She also supports the Applied Systems Thinking Institute (ASysT). She holds an M.E. in Systems Engineering from the Stevens Institute of Technology and an M.S. in Biohazardous Threat Agents and Emerging Infectious Disease from Georgetown University. She is currently pursuing a PhD in Systems Engineering from the Stevens Institute of Technology.

Dr. Art Pyster is a distinguished research professor at the Stevens Institute of Technology.