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INFORMATION SHARING AT THE FRONT LINES AS A WICKED PROBLEM

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INTRODUCTION

Soldiers at the front line have a constant need for timely, valid, reliable, and useful information to accomplish their mission. Information sharing is a critical element in helping them meet this need; the best information is without value unless it is made available to soldiers who need it. Effective information sharing is especially critical for the implementation of the counterinsurgency (COIN) strategy employed by the U.S. military first in Iraq and now in Afghanistan. The COIN strategy constitutes a paradigm shift from the military's traditional emphasis on "force-to-force" combat to an approach aimed at providing security and assisting with nation-building, including the development of governance structures. As one soldier aptly put it at a recent workshop, "our mission is not so much about the pursuit and destruction of insurgents but more about understanding tribal connections." Military policy makers, strategists, and field personnel agree that information sharing plays a much more central role in COIN operations (asymmetric warfare) than in traditional or symmetric warfare. The Department of Defense sees information sharing as a key mission enabler (Department of Defense Information Sharing Implementation Plan, 2008; p. 2).

Information sharing in DoD has received a lot of attention in recent years, as indicated by the development of the DoD information sharing strategy in 2007, the DoD information sharing implementation plan in 2008, and initiatives by General Peter Chiarelli and Maj. General Michael Flynn and others. However, soldiers and other front line personnel and organizations including NATO coalition partners, Afghan security forces, NGOs, and USAID, to mention a few, find themselves facing confounding problems that

significantly hinder the flow of information they need in order to succeed. There is strong evidence that many of the information sharing issues that have emerged in the context of COIN are not just tough and challenging to address – they are actually quite "wicked" in nature. Given the nature, scope, and salience of these issues, we suggest that they should be examined through the lens of the "wicked problem," a concept that has received significant attention in the academic literature and from policy analysts and other practitioners. In our opinion, viewing information sharing issues as wicked problems offers deeper insights into the complexities of these issues and affords us an opportunity to tackle the numerous issues associated with information sharing in a more innovative and hopefully more effective manner. Toward this end, the purpose of this paper is to summarize and integrate the work of the Policy Innovation and Analysis Project on information sharing with and among soldiers at the front line and wicked problems. More specifically, we will first define and discuss the concept of wicked problems. Select information sharing issues will then be examined through the lens of the wicked problem. The paper will conclude with a discussion of methodologies to address information sharing issues.

WHAT IS A WICKED PROBLEM?

The concept of wicked problems, as first developed by H. J. Rittel and Melvin Webber in the 1960s and 70s, has more recently been used by scholars in public administration and the policy and system sciences to analyze the dynamics and complexities of many problems in the public as well as in the private sector (Weber & Khademian, 2008; Camillus, 2008; Australian Government, 2007; Conklin, 2006). Wicked problems tend to be socially complex and difficult to define; they typically involve numerous stakeholders with often differing interests and values; finding solutions goes beyond the capacity of any one organization; and disagreement over causes of a particular problem and potential solutions is high. Additionally, in wicked problem settings technological issues, as well as the interface between technology and organizational and policy variables, are often at the core of deliberative efforts aimed at gaining a better understanding of the problem and finding solutions. In other words, wicked problems tend to be messy, circular, aggressive, and without a stopping point; they typically crop up in highly dynamic settings that are constantly changing or face unprecedented challenges. Given these general dimensions of wicked problems, it appears that it would be appropriate to apply the concept of the wicked problem to the domain of information sharing at the front line.

Tame problems, on the other hand, are very different in nature and require more traditional approaches in order to find solutions. According to Conklin (2006), for tame problems a well-defined problem statement can be developed, there is a stopping point when a solution is reached, a limited number of alternative solutions can be evaluated and a preferred one selected, and potential solutions can be gleaned from similar problem settings. For dealing with tame problems, the traditional linear approach - identifying the problem, gathering data and analyzing the problem, comparing alternatives, and selecting a preferred alternative - which is so often used in policy analysis, is sufficient for finding a timely solution. As we will see, however, "wicked problems require innovative,

comprehensive solutions that can be modified in the light of experience and on-the-ground feedback" (Australian Government, 2007; p.1). Construction of a freeway interchange, installing a new computer system, or designing a new application process for obtaining a construction permit are typical examples of tame problems. Examples of wicked problems include the recent global financial crisis, climate change, obesity, and most social problems.

WICKED PROBLEMS IN INFORMATION SHARING

Our research clearly indicates that the most defining characteristics of wicked problems, as described in the literature, are also present in the information sharing domain at the front line and throughout the Department of Defense, as well as in other policy areas such as homeland defense and emergency management. In this section of the paper we will address specific wicked issues that pose a series of challenges to making information sharing more effective. Clearly, improvements in information sharing will help save soldiers' lives, prevent injuries, and assist with nation-building.

First, wicked problems tend to be highly unstructured and difficult to define. This means that there are often multiple, overlapping, and interconnected root causes and subsets of issues that cut across organizational entities and involve numerous stakeholders with differing agendas, value orientations, biases, and traditions. Cause and effects are difficult to discern, which adds complexity and conflict because stakeholders disagree on what the problem is about and on what should be done to solve it (Weber & Khademian, 2008). In the case of information sharing as practiced in the military today, all of these descriptors of wickedness appear to be present.

Our empirical research, which involved interviews with scientists, consultants, policy makers, high-ranking military officials, and soldiers with deployment experiences in Iraq and Afghanistan, as well as a review of the literature, has identified numerous problems that impede the flow of information to and among soldiers and other relevant individuals and organizations (Feltovich, Bradshaw & Bunch, 2009). The most challenging problems in information sharing are organizational and technological in nature (Bockman, Sirotnik & Ruiz, 2010). Organizational problems pertain to agencies' desire to maintain the status quo and to defend their turf, the lack of coordination and communication among agencies, differences in organizational culture, concerns over the confidentiality and security of information, and individuals' desire to maximize power. Technological problems affecting information sharing include the lack of standardization of systems as well as the compatibility between systems, source protection, and the speed at which the acquisition process works - the procurement of technology takes much too long, given the rapid changes in technology development, and problems associated with information overload. Of course, many of these problems overlap. Organizational problems (e.g., organizational culture) affect other organizational problems (e.g., issues of information confidentiality and security) as well as problems in the technological domain (e.g., source protection). The stove-piping of organizational structures has ramifications for the acquisition process, and innovations in information sharing can be blocked by

bureaucratic maneuvers aimed at protecting both turf and power position. According to Lt. General Peter Chiarelli, “Information is firewalled by the bureaucracy. Commanders are unable to get the information they need because of bureaucratic obstacles” (Defense News, Jan. 28, 2008).

Information sharing problems cut across organizational boundaries and involve multiple stakeholders, such as Army units at different hierarchical levels, contractors, intelligence agencies, legislative and executive bodies, coalition partners, and others. In such a heterogeneous and complex setting it should come as no surprise that value conflicts, differences in strategic thinking and action, disagreements over policy, and diverging views of what a particular problem in information sharing is about are critical contextual variables that make problem solving difficult. An example of this concerns the efficacy and interoperability of currently deployed Army intelligence and information sharing systems in Iraq and Afghanistan such as the DCGS-A system, CPOF, TIGR, and CIDNE. Although individually all these systems have great capabilities to achieve the outcomes for which they were designed, in the opinion of soldiers, they constitute fragmented platforms for information sharing purposes.

Our survey shows that soldiers would prefer a more integrated system that would provide them with the information they need in a timely manner. Soldiers also indicated that despite functionality and usefulness, access to and a lack of proper infrastructure to support the systems impede their use and productivity. As one soldier put it, there is “too much for the infrastructure to support.” Connectivity and speed are major causes for concern among soldiers on the ground (47% of responses); “programs are too slow to work at times.” Due to limited availability and reliability, soldiers often turn to the most commonly shared systems to pass information, SIPR and NIPR. As one soldier expressed, “Everyone has an email address.” The question is why has it been so difficult to bring about system integration? The answer to this question can be found in the interorganizational setting described above.

As discussed in an earlier IPA policy paper (IPAP: The ‘Big’ P Policy Issue, June 2004), DCGS-A represents a perspective that information sharing should follow the traditional, hierarchical structure of military organizations. From this perspective, information sharing follows the command-and-control organizational structure in a top-down format. Support for this viewpoint appears to come primarily from higher-ranking officers who have not necessarily made the transition from conventional warfare to asymmetric warfare.

An alternative perspective, typically provided by lower-ranking and younger officers, maintains that information should not only flow vertically but also horizontally, with more decision making authority on information sharing matters allowed at lower levels of the military organization. Supporters of this perspective are more inclined to work with systems such as TIGR. Support for both of these competing viewpoints comes not only from within the Army but also the larger military organization as well as the Executive Branch, Congress, and contractors involved in the development and maintenance of these systems. The clash of these two perspectives, which tends to be rooted in different value

orientations and experiences, is indeed quite wicked. So far, finding a resolution to this conflict has not been met with great success.

Second, wicked problems tend to be relentless; they usually do not have a clear solution. Therefore, problem solving must be seen as an ongoing and incremental process with no stopping rules. Problem solving typically may be interrupted when deadlines are met, when resources are exhausted, or when one technology is outpaced by a newer and more promising one. Still, the core problem remains, as the example of TIGR demonstrates. The TIGR System was developed a few years ago to give tactical soldiers the ability to share and mange information critical to their operations (Network Science Center, May 2010). While TIGR constitutes great progress in information sharing at the front line, especially in a COIN setting, significant shortcomings remain. The system, which is only six years old, is already based on an outdated technology. New efforts are necessary to move the system to higher levels of performance and to avoid obsolescence.

Third, attempts to address wicked problems often generate unforeseen consequences. "Because wicked policy problems are multi-causal with many interconnections to other issues, it is often the case that measures introduced to address the problem lead to unforeseen consequences elsewhere" (Australian Government, 2007; p. 4). Again, this characteristic of a wicked problem is manifested in the military information sharing domain. Often, information cannot be shared because it is classified, although there does not appear to be a need for classification. Soldiers indicated a lack of knowledge concerning proper classification procedures and expressed a desire to receive "better education on how to classify in order to prevent sharing limitations."

Technology and security issues converge when the use of certain systems and their classification level deem information automatically un-sharable between US forces and coalition groups, creating situations "where [they] could not fully use our coalition partners." Given the frequency of such occurrences, it has been suggested that the classification process and policies should be reviewed to arrive at more appropriate criteria for classifying information. A by-product of such a review could be the de-coupling of classified information and sensitive information that does not necessarily require classification. Some in the military feel, however, that easing restrictions on classification could make it easier for the enemy to gain access to vital information. Fears that changes in classification policies could have dysfunctional consequences have made it difficult to find solutions to this problem. Soldiers struggle with the dual concern of security and ability to work with coalition partners. Soldiers would like to see an "implementation of more coalition based knowledge management systems using assured file transfer guards and common data elements" and would like to also "reduce classification of routine battlefield data, not all data is secret. Latest time information of value is key."

The literature identifies several other aspects of wicked problems that could be explored in the context of information sharing at the front line. Wicked problems are socially complex, they transcend the jurisdiction and responsibility of any one organization, they require behavior change, and they are often subject to chronic policy failure (Australian

Government, 2007). A detailed discussion of these aspects of wicked problems and their application to information sharing would, however, go beyond the scope of this paper.

STRATEGIES FOR ADDRESSING WICKED PROBLEMS

As indicated above, there is no quick fix for dealing with wicked problems, including the numerous wicked ones at work in information sharing settings at the front line. Traditional linear approaches to problem solving are totally inadequate for addressing wicked problems. Finding ways to effectively deal with wicked problems requires holistic rather than linear thinking and necessitates working across organizational boundaries to include key stakeholders tasked to collectively develop strategies and methodologies to resolve issues associated with the problems in information sharing discussed above. Traditional bureaucracies with stove-piped organizational structures, a top-down approach to decision making, and a risk-aversive orientation, are typically not well prepared to deal with wicked problems. However, there is a rich body of literature that offers innovative strategies to deal with wicked problems. We can address some of the more promising strategies in outline form only.

1. Collaborative and network-based strategies are becoming recognized as being most effective in dealing with wicked problems (Dawes, Cresswell & Pardo, 2009; Hatala and Lutta, 2009; Weber and Khademian, 2008; Australian Government, 2007). A word of caution is called for, however, when it comes to using these strategies for dealing with wicked information sharing problems. Effective information sharing is typically seen as a prerequisite for building and operating collaborations and networks. When working in the information sharing domain, however, developing collaborations and networks would require that optimal information sharing practices are in place; otherwise, trying to build collaborations and networks would indeed be a futile endeavor. We are dealing here with a chicken and egg dilemma that remains unaddressed for the time being.
2. Dialogue mapping is another strategy aimed at generating shared understanding and commitment by all stakeholders in wicked problem settings Conklin (2006). The assumption is that a group's understanding of a wicked problem is constantly evolving. Dialogue mapping can help facilitate communication among stakeholders and therefore increase understanding of wicked issues.
3. Given the interconnectedness and social complexity of wicked problems in the information sharing domain, as well as the strong interface between organizational and technological barriers, any intervention strategy must be anchored in an interdisciplinary framework that harnesses specific expertise from relevant disciplines (e.g., organizational and managerial specialists, social scientists, technologists, military experts, etc.) and the experiences of front line personnel.
4. The concept of "surprise management," as developed by Farazmand (2009), appears to hold some promise for application in wicked problem solving settings. Derived primarily from complexity theories and dynamic systems theories, it

strives to offer innovative ways to deal with fluid, dynamic, and complex settings, similar to the wicked problem settings discussed in this paper.

CONCLUSION

The U. S. Department of Defense has appropriately labeled information sharing a mission enabler. Our research shows, however, that there are numerous information sharing problems that impede the flow of information to soldiers at the front line. Indeed, our survey of soldiers with recent deployments in Afghanistan and Iraq shows that they had experienced significant difficulties with information sharing, and that their work had been negatively affected by these difficulties. Many of the information sharing problems we have identified in our research have characteristics that are typically present in wicked problems. We therefore decided to more closely examine specific information sharing problems at the front line through the lens of wicked problems.

The task now is to tackle these wicked problems in the information sharing domain. To get started, an essential first step is to recognize the multitude of information sharing challenges as wicked problems. Unless this first step is taken, current problem solving endeavors may bring about some minor improvements in information sharing but not the more fundamental changes that are required to better serve soldiers at the front line. Second, the military must significantly strengthen its problem solving capacity in order to tackle wicked information sharing problems. Toward this goal, innovative and comprehensive strategies suitable for tackling wicked problems have to be developed and implemented. As discussed in this paper, traditional linear problem solving approaches do not work when it comes to wicked problems. Several innovative strategic frameworks for tackling wicked problems were mentioned in this paper. These and others should be explored in much more detail; the most promising ones should then be considered for adoption.

This paper represents a first attempt to look at information sharing problems as wicked problems. Additional work needs to be done to gain a better understanding of these problems and to arrive at problem solving outcomes that will ensure that information sharing fully deserves to be called a mission enabler. We hope that this paper has made a modest contribution toward this lofty goal.

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