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Al-Qaeda's Innovative Improvisers: Learning in a Diffuse Transnational Network

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Abstract *Al-Qaeda is commonly described as a highly flexible and adaptable non-state network, making it difficult for states to combat. Although these features are associated with networks in theory, they are not inherent to networks in practice, and rely largely on organisational learning. A network that fails to learn is not likely to adapt successfully. This paper explores the learning implications of al-Qaeda's transnational network structure, focusing on decentralisation and reduced hierarchical control following the loss of its Afghanistan base. Drawing from organisational theory research, the paper uses an exploration–exploitation framework to offer hypotheses about how learning is evolving. It suggests a wider space for exploration, rendering a dispersed, decentralised al-Qaeda more innovative, balanced by a weakened ability to exploit resources and expertise. Networked al-Qaeda militants are described as 'innovative improvisers' with high creative potential but low professionalism. By delving into the mechanisms of learning, the paper builds knowledge of what specific circumstances affect al-Qaeda's purported agility as an actor. Further research is recommended on how states might respond to innovative improvisers. Such research should extend beyond popular proposals for 'networked' national security to innovation and learning in their own right.*

Introduction

A growing priority in organisational theory research—though less so in international security research—has been to understand the role of 'networks'. In 1990, Walter Powell argued that the 'network form of organization' was a mode of exchange that a dichotomous view of markets and hierarchies could not explain. Networks are built on horizontal patterns of communication and informal, reciprocal relations among individuals, rather than bureaucratic routines and hierarchical command. Powell theorised that networks facilitate the flow of information and trust among participants, making them 'lighter on their feet' and quicker to adapt. Although subsequent empirical research focused mainly on networks in the private sector, networked collaboration flourished in a variety of areas. According to several international relations scholars, non-state networks, with their agile and creative use of cheap, widely available communications technologies, are challenging state-based conceptions of the field.[1]

In the security community, the terrorist attacks of 11 September 2001 drew widespread attention to networks, with particular interest in their strengths and

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[1] See, for example, John Arquilla and David Ronfelt (2001) and Kathryn Sikkink and Margaret Keck (1998).

weaknesses compared with a state's more hierarchical national security apparatus. A consensus emerged that the al-Qaeda 'netwar' model is typically more flexible, adaptable and resilient than hierarchical opponents (Arquilla and Ronfeldt 2001; DeYoung 2006). Daniel Benjamin and Steven Simon, National Security Council (NSC) Counterterrorism Directors under the Clinton administration, described these networks as 'supple, malleable, invisible' foes (2003, 170). Bruce Hoffman, head of RAND's terrorism research unit in Washington and founding director of the Centre for the Study of Terrorism and Political Violence at the University of St Andrews, similarly highlighted their 'nimble, flexible, and adaptive' quality (2003, 12). Rohan Gunaratna, author of *Inside Al-Qaeda: Global Network of Terror*, characterised his subject as 'fluid and dynamic ... liable to change its structure according to circumstances' (2002, 79). Colonel Russell Howard, like many others, agrees that al-Qaeda's 'networked, cellular structure' has made it highly adaptable and difficult to penetrate (2004, 80).

Flexibility and adaptability, however, depend in large part on the ability to learn. To survive and be 'adaptable', a terrorist organisation must learn to identify and circumvent rapidly shifting countermeasures, avoid past mistakes and recover from other missteps.[2] Hunted by larger, conventionally stronger adversaries, it must learn how to launch surprise attacks by assembling knowledge, resources and expertise, combinations of which vary as targets harden, technology advances and terrorists' own agendas change. Learning is, in many respects, the essence of adaptation. Yet the learning implications of al-Qaeda's transnational networked structure have received limited attention, overshadowed by assumptions about how agile networks are thought to be in theory.[3] Drawing on perspectives from organisational learning research, this paper will explore al-Qaeda's ability to learn as it evolves into a more networked, diffuse structure.

After a brief discussion of al-Qaeda's structural changes, the paper uses an exploration–exploitation learning framework to analyse the learning implications of these changes (March 1991). This framework emphasises two dimensions of organisational learning: the ability to explore new ideas, tactics, resources and expertise, on the one hand, and the ability to bring them to bear and exploit them effectively, on the other. Exploration includes activities such as experimentation, search, risk-taking and innovation; whereas exploitation involves refinement, efficiency, execution and professionalism. While both are important dimensions of learning, exploration at the expense of exploitation can generate half-baked ideas that are not followed through effectively, and exploitation without exploration can render organisations stagnant and unresponsive. The paper suggests al-Qaeda's decentralised, networked evolution has expanded exploration while weakening

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[2] On the importance of terrorist adaptation for survival and the need for constant evolution, see Bruce Hoffman (1998). In addition, see Martha Crenshaw (1988) for a discussion of terrorism as 'par excellence a strategy of surprise', calling for swift learning, adaptation and doctrinal or technical innovation to maintain the possibility of surprise that is so critical for success.

[3] One recent exception is a RAND study on 'Organizational Learning in Terrorist Groups and Its Implications for Combating Terrorism', spearheaded by Brian Jackson (Jackson et al 2005). This useful study takes a more holistic approach to the subject; it presents a general information-processing framework for the use of organizational learning perspectives for counterterrorism. The present paper builds on this study by focusing more narrowly on learning in a transnational networked structure.

exploitation in its ability to learn. As a result, al-Qaeda terrorists are described as 'innovative improvisers', potentially more innovative with greater access to tools, resources and strategies around the world, but forced to improvise in a looser, less accountable structure.

Al-Qaeda's Structural Evolution

Despite the flurry of attention to stateless and shadowy networks of terrorists in semi-autonomous cells following the 9/11 attacks, al-Qaeda had a hierarchical leadership and decision-making body between 1996 and 2001 known as the 'consultative council'. Moreover, it was not stateless; it used the state of Afghanistan under the Taliban as a safe haven, a base to centrally plan and coordinate terrorist operations around the world. This high command was a 'vertical leadership structure' providing 'strategic direction and tactical support to its horizontal network of compartmentalized cells and associate organizations' (Gunaratna 2002, 73). Osama bin Laden was both a 'terrorist CEO' who defines general goals and a sense of higher purpose, and a venture capitalist who solicits ideas from below for funding (Hoffman 2002, 38). Members or associate groups would typically submit proposals to the consultative council in Afghanistan, which would select a small number—such as the East Africa embassy bombings in 1998 and the 'planes operation' of 9/11—for further, top-down development.

After American, British and other coalition forces dismantled the Taliban in late 2001, Afghanistan could no longer offer al-Qaeda a safe base for training, centralised decision-making and coordination of activities. According to a number of analysts, the organisation's primary adaptation to the destruction of its headquarters and much of its core leadership has been to evolve into a diffuse global network, working loosely with a broader movement of affiliated groups and individuals inspired by al-Qaeda's jihadist–Salafist worldview.[4] In Gunaratna's analysis, the diaspora of the jihadist community in Afghanistan has made the 'constituent groups of Al Qaeda operate as a loose coalition, each with its own command, control and communication structures' (2002, 75, 123). Former Director of Central Intelligence George Tenet warned of al-Qaeda's transition into a 'loose collection of regional networks that operate more autonomously' as part of a 'global movement infected by al-Qaeda's radical agenda' (*The Economist* 2004). Jason Burke (2003, 179, 240) and Marc Sageman (2004, 167) maintain that 'al-Qaeda' as it functioned between 1996 and 2001 no longer exists, having disintegrated into a loose 'network of networks'. The annual report of the United States Department of State on global terrorism also notes these changes (DeYoung 2006).

A more precise view of al-Qaeda's structure is, of course, difficult due to its clandestine nature. Some analysts emphasise al-Qaeda's main function as an inspirational ideology with a few heroic figures, such as bin Laden, fuelling a broader, locally diverse movement, with little control over dispersed terrorists; still others maintain such a view is premature, holding that al-Qaeda leaders continue to

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[4] For variations on this view, see the volume *Al Qaeda Now: Understanding Today's Terrorists* (Greenberg 2005), which brings together terrorism experts such as Bruce Hoffman, Peter Bergen, Steven Simon, Marc Sageman, Rohan Gunaratna and Jessica Stern to address the changing nature of the al-Qaeda threat.

exercise influence over their networked allies, offering guidance, logistical backing and financial support in addition to inspiration.[5] While Hoffman cites uncertainty over al-Qaeda's status as good reason not to underestimate it (2003, 3), Gunaratna warns against 'overemphasising' al-Qaeda, only a 'star' in the wider 'galaxy of violent Islamist groups' (2004, 98). While ambiguities remain, this paper will focus on learning patterns with respect to the general, more widely acknowledged features of al-Qaeda's structural evolution following the loss of its Afghanistan headquarters, namely decentralisation, reduced hierarchical control and heightened local autonomy in a loosely networked mode of organisation.

Exploration in the Networked Structure

This section examines how the exploration dimension of learning is evolving as al-Qaeda becomes a more diffuse global network, with reduced control over loosely affiliated groups inspired by its ideology. It suggests that greater inter-organisational cooperation, access to weak ties, and local autonomy enhance the ability to explore new possibilities for achieving goals, making a networked al-Qaeda more innovative in theory. Innovation is generally conceived as the use of novel methods or unexpected combinations of conventional methods; its purpose in terrorism, as Marsha Crenshaw establishes, is to maintain the possibility of surprise that is so important for success against asymmetric opponents (1988, 15). Thus, acquiring a new weapon, the expertise to build a new weapon, knowledge of the vulnerabilities of a target, and access to new targets in an area left previously unattacked would fall within the scope of exploration.

Inter-organisational Cooperation and Weak Ties

According to organisational learning research, inter-organisational cooperation enhances the exploration dimension of learning by providing exposure to new ideas, resources and expertise that would otherwise not be available (Romme and Dillen 1997). It also enables learning from the experience of others (Levitt and March 1988). In the context of terrorism, for example, Indonesia's Jemaah Islamiyah learned about terrorist tactics and especially the use of explosives through its collaboration with al-Qaeda (Abuza 2004). Conceiving of al-Qaeda as a 'vanguard' to inspire a broader jihadist insurgency, bin Laden has historically emphasised such cooperation, coopting local militant groups through offers of support and the inclusive ideological appeal of his anti-American stance (Hoffman 2002, 40).[6]

As it moves into a more networked structure and reacts to the loss of its Afghan base, al-Qaeda is likely to seek further opportunities to cooperate with like-minded

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[5] For discussions of these different conceptions of al-Qaeda's status and the degree of control exercised by its remaining leadership, see Kenneth Katzman (2005), Randy Borum and Michael Gelles (2005) and Daniel Byman (2003).

[6] For example, al-Qaeda's cooperation in varying degrees with Jemaah Islamiyah, the Abu Sayyaf Group and Hezbollah is well documented (Gunaratna 2002, 127–221; Hoffman 2002, 40). Its alliance with the Egyptian Islamic Jihad and a number of other jihadist groups from Pakistan and Bangladesh, forming the World Islamic Front in 1998, illustrates the learning potential of inter-organizational cooperation. The alliance increased al-Qaeda's set of options for targets, methods and personnel by expanding its reach, empowering it to plan and execute attacks in Kenya and Tanzania from its isolated position in Afghanistan (Singerman 2004, 157).

jihadists, widening its own exposure to outside ideas, tactics and expertise. Research on networks supports this shift, showing how failure at a domestic level encourages transnational networking as an alternative. In their study of transnational advocacy networks, Sikkink and Keck (1998) show that networks arise when a group of activists in one country is blocked from effecting change at the national level. This 'boomerang effect' encourages domestic activist groups, prevented from pursuing their agenda at home, to seek like-minded groups in other countries with different sets of resources, strategies and opportunities to act. Social movement literature on Islamist networks in particular (Singerman 2004; Wiktorowicz 2001) explains their transnational expansion as a response to domestic repression and, in some cases, ideological interest in pursuing a 'nomadic jihad' (Roy 1999).

In the field of terrorism, inter-organisational cooperation is indeed taking place far more broadly, with scattered al-Qaeda leaders and training camp 'graduates' energising and supporting other jihadist militants around the world (Borum and Gelles 2005; Hegland 2004; Gunaratna 2004; Byman 2003). According to Hoffman, the greatest change after the wars in Afghanistan and Iraq has been the breakdown in the rigid boundaries that used to separate militant Islamist groups (reported in Hegland 2004). He argues these groups are growing much more permeable, as individuals from varying backgrounds, of different nationalities and with diverse skill sets work together in temporary teams to pursue similar goals. Although some, primarily motivated by local grievances, may not share al-Qaeda's commitment to a globally oriented Salafist jihad, many have adopted a more pragmatic approach, having recognised the advantages of increased cooperation and networking (Byman 2003).

From an organisational learning perspective, al-Qaeda will theoretically be able to explore a broader set of possibilities for achieving its goals as its remnants pursue greater inter-organisational cooperation. Al-Qaeda leaders' long-negotiated decision to work with Abu Musab al-Zarqawi in Iraq, for example, demonstrates the learning advantages of such cooperation (Murphy 2004). Intending to maintain his own organisation called 'Tawhid and Jihad', Zarqawi reportedly avoided allying with al-Qaeda due to differences with bin Laden, who disliked him and his divisive anti-Shiite rhetoric. In October 2004, however, Zarqawi announced a new name for his organisation, 'Al Qaeda in the Land of the Two Rivers', in an online statement. Bin Laden followed it up in December with a taped statement confirming the alliance, referring to Zarqawi as his organisation's 'emir' in Iraq. According to reports, the alliance was essentially pragmatic, growing out of the mutual benefits of cooperation (Weaver 2006; Murphy 2004). A foreigner in Iraq, Zarqawi sought to win indigenous popularity among Sunnis through the transnational appeal of al-Qaeda as a 'brand'. And al-Qaeda, lacking operational capabilities in Iraq, learned how to adapt by courting other organisations with these resources, enabling it to explore more possibilities for exercising its own influence abroad.

Evidence from organisational theory research also shows that networks of groups and individuals that span formal organisational boundaries are an important source of innovation in industries where the knowledge base is complex, changing rapidly and widely dispersed, such as the biotechnology sector (Powell et al 1996). According to the State Department's annual terrorism report, geographically dispersed cells are exploring increasingly sophisticated kinds of attack (DeYoung 2006). For al-Qaeda, the relevant knowledge base leading to a successful operation may be very complex. Attacks involving the acquisition, development and

meticulous combination of materials for chemical and biological weapons, for example, can require specialised expertise. Attacks on information infrastructures may also involve complex knowledge of their vulnerabilities. This knowledge is likely to be more dispersed than when al-Qaeda could concentrate its planning and development efforts in a central headquarters. Looking at such dispersed and complex knowledge as the basis for a modern 'terrorism industry', inter-organisational networks open the door to greater exploration by bringing to light coveted experts—such as chemists, engineers and computer scientists—who are important for sophisticated strikes.

Lastly, al-Qaeda's more diffuse, networked structure facilitates learning through exploration through its openness to 'weak ties'—loose connections between people whose relationship is casual and based on infrequent communication. Weak ties, as Mark Granovetter's classic work (1973) on their value to job seekers shows, can be more valuable than stronger ties because they unearth new, unfamiliar information and options. In a looser, geographically decentralised and diverse structure, as opposed to the more concentrated, contained arrangement in Afghanistan, weak ties may be more available. By opening up new possibilities, these ties build the potential for innovation, as the example of Ishtiaque Parker illustrates. A South African student at Islamabad Islamic University, Parker was a weak tie recruited by Ramzi Yousef. Yousef was an indefatigable terrorist loosely connected to al-Qaeda before his capture.[7] Parker's South African passport and apparently unsuspicious appearance introduced novel tactics, as when Yousef had the university student transport suitcases of explosives. In time, however, Parker betrayed his recruiter, demonstrating that although weak ties can increase the space for exploration, they can also reduce security. In online settings where cells are currently forming (DeYoung 2006), the fragile and temporary nature of weak ties may further threaten security because trust is more elusive, according to some research on virtual teams.[8]

Local Experimentation and Autonomy

A networked structure may also support broader exploration in learning through reduced hierarchical control, since ideas, not tethered to a centralised decision-making body's approval layers, can be tested out more readily. Organisational learning research on Silicon Valley organisations, for example, has demonstrated that a less entrenched culture of hierarchical control and institutional rigidity encouraged widespread experimentation and entrepreneurship, giving the area an innovative edge over the more hierarchical firms in Boston's rival technology region (Saxenian 1994). According to a RAND study, a similar effect is seen in terrorism when networked structures allow individual units more autonomy, widening the space for experimentation at the tactical level (Jackson et al 2005, 38). The RAND report drew upon a case study of learning in the Provisional Irish

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[7] This account of Ishtiaque Parker as a weak tie is taken from Sageman's empirical work on mujahedeen (2004, 109). Sageman argues that the recruitment of a weak tie in this case was a deviation from al-Qaeda's normal pattern of relying on strong personal ties and familial bonds for recruitment. He also highlights the security liabilities associated with recruiting weak ties.

[8] See, for example, Sirkka Jarvenpaa and Dorothy Leidner (1999) and Patricia Wallace (2004).

Republican Army to argue that local autonomy increased variety and innovation in attack patterns, freeing individual units from learning constraints imposed by a hierarchical command structure.

Without the Afghanistan rite of passage, the expectation and ritual of travelling to the camps and submitting proposals through a hierarchical decision-making body, the thousands of al-Qaeda trainees and aspiring members may have more freedom to experiment locally with their own ideas. Indeed, one of bin Laden's former bodyguards in Afghanistan emphasised heightened local autonomy as a strategic change. 'According to Osama bin Laden's thinking,' he said, 'there are no dormant cells . . . . Every element of al Qaeda is self-activated. Whoever finds a chance to attack just goes ahead. The decision is theirs. This is regardless of whether they pledged allegiance to Sheik Osama bin Laden or not' (quoted in Coll and Glasser 2005, A01). Assuming a sufficient level of motivation, dispersed radicals will find it easier to experiment without the rigid hierarchical control exercised by al-Qaeda's consultative council, giving them more opportunities to learn through exploration.[9]

For example, Zuhayr Hilal al-Thubayti told the Moroccan authorities who arrested him for planning an operation against US naval vessels in the Straits of Gibraltar that al-Qaeda had originally *rejected* him for foreign missions due to his training results, which were 'not satisfactory' (Ilhami 2002; Sageman 2004, 123). Reduced hierarchical control following the loss of the Afghan base empowered him to experiment on his own, instead of being the vehicle for operations planned from above. Of the East Africa embassy attacks, the Nairobi cell leader Harun Fazil wrote in a memo that 'We, the East Africa crew, do not want to know how work plans are operated because we are not fit for plans. We are just implementers. We, thanks be to God, trust our command and appreciate their work' (quoted in Benjamin and Simon 2002, 27). In comparison to this hierarchically directed activity, the post-9/11 attacks in Madrid, Mombasa, Riyadh, Bali and London demonstrate increased local initiative and experimentation, with attackers adapting to local conditions more readily. The State Department highlighted this trend in its annual report on global terrorism, pointing to the rise of 'micro-actors' that are less subject to hierarchical control (DeYoung 2006). Their greater autonomy facilitates local experimentation with a wider set of ideas, improving the ability to learn which ideas work best through trial-and-error exploration—though such experimentation is not necessarily always successful, as al-Thubayti's case illustrates.

Other graduates from al-Qaeda's training camps, however, may be significantly more qualified to explore ideas on their own. The training in Afghanistan emphasised entrepreneurship, teaching recruits how to establish self-sufficient terrorist cells that could operate independent of a central command (Gunaratna 2002, 110). They were also taught how to manufacture explosives from commercial products, procure transport and store munitions near a target. According to Burke, senior bin Laden aides would spurn volunteers requesting martyrdom operations if they were not able to come up with their own ideas for attacks (2003 208). Al-Qaeda's legacy of entrepreneurship could encourage widespread exploratory

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[9] Sageman's empirical work on mujahedeen suggests, moreover, that motivation to 'join the jihad' is so widespread that al-Qaeda did not typically have to rely on formal, resource-intensive recruitment efforts (2004, 122).

learning that would otherwise have declined in a looser, networked structure due to the lack of standard training and clear chains of command.

Exploitation in the Networked Structure

In theory, then, greater inter-organisational cooperation and heightened local autonomy in the networked structure expand al-Qaeda's capacity for exploration, rendering it a more innovative actor or set of actors. Yet expanded capabilities for exploration do not necessarily lead to greater lethality or effectiveness in terrorist operations. Even if al-Qaeda is well positioned for innovation as it grows more networked, it must be able to absorb and exploit ideas, information and expertise effectively. This section explores how the networked structure is affecting the exploitation dimension of learning, which focuses on the refinement, improvement and extension of capabilities.

Improvisation and Organisational Memory

Before al-Qaeda's dispersal, the training camps in Afghanistan provided a centralised space for exploitation-focused learning, with the arriving mujahedeen taking established classes in a wide array of subjects to develop and refine relevant skills. L'Houssaine Kherchtou, a Moroccan trainee in Afghanistan who testified that he joined al-Qaeda in 1991, said that weapons training was typically combined with a physical training regimen and religious instruction. Courses also covered surveillance, the covert use of cameras and techniques to encode intelligence reports on computer disks. Trainees learned how to organise an operation by designating teams for surveillance, planning, logistics and execution of the attack. In addition, al-Qaeda helped arrange for trainees to receive further instruction through legitimate channels, such as the American flight schools attended by the 9/11 pilots. Kherchtou said he studied in a shop where al-Qaeda operatives were preparing travel documents, such as visas and passports, and working on encryption devices, watches, radios and other equipment for use in bombing operations.[10]

In a more networked al-Qaeda, absent the extensive Afghan infrastructure of camps and their teaching curricula, learning of the exploitation variety may best be viewed from the perspective of Jean Lave and Etienne Wenger's 'legitimate peripheral participation' model (1991). Emphasising the learner's perspective and initiative, this model explains how newcomers become part of an organisation by participating on the periphery, with gradual community recognition of their legitimacy as members of the organisation. Earlier theories of learning emphasised a teaching curriculum, based on the idea that learning was accomplished when a teacher transmitted knowledge to a pupil, who came to internalise it. Lave and Wenger departed from this orientation by underscoring the social process of learning in organisations, with learners playing a more active role in their own learning. Learners tend to learn more from each other as they participate in the practice of the organisation under the protection of 'benign community neglect' or tolerance of their early missteps.

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[10] A summary of L'Houssaine Kherchtou's testimony on what he learned in the Afghan training camps can be found in Benjamin and Simon (2003, 124–127). For more information on training, see Gunaratna (2002, 93–101).

Without the formal curricula at the camps, those interested in al-Qaeda's brand of global jihad must turn to each other for guidance regarding how to carry out effective attacks, and must also exploit knowledge available online. Based on his empirical findings concerning the process of joining the jihad, Sageman (2004; 2005) has drawn attention to the deeply social character of modern Islamist militancy. In his sample, it was far more common for groups of friends and family to join than individuals, and the gradual intensification of their friendship preceded their ideological commitment to jihad. These groups, such as the young men who met in Hamburg and Montreal, would increasingly associate commitment to jihad with the strength of their friendship. A process of one-upmanship played out as group members raised the stakes for participation in jihad, leading ultimately to volunteering for martyrdom operations or the risk of expulsion from the group. Without the benefit of Afghan camp training, these tight social groups are more likely to seek local opportunities to engage in the practice of al-Qaeda-influenced militant jihad, testing out their ideas on familiar ground as a means of peripheral participation.

The concept of peripheral participation raises uncertainties about how the benefits of learning will be stored, distributed and applied in the future. With greater access to new ideas and resources and more freedom to experiment, al-Qaeda's exploration capabilities may be enhanced, but their decentralised character is potentially problematic for organisational memory. Organisational memory is a key component of learning, dealing with how organisations encode, store and retrieve lessons of history, despite the turnover of personnel and passage of time (Levitt and March 1988). It matters especially for the exploitation aspect of learning, which relies on cumulative maintenance and refinement of capabilities. Depending on how communication evolves, a decentralised, improvised pattern of learning could result in a fragmented, unstable source of organisational memory that impedes exploitation. Exploration is also significantly limited if the lessons of experience are not conserved and shared efficiently, with valuable weak ties and channels of inter-organisational cooperation not made available. Networks in theory provide fast, reliable access to the right people and resources (Powell 1990). But if these networks are too fragmented and amorphous, with communication seldom, ineffective or antagonistic, organisational memory will erode, stunting the ability to learn and inviting a permanent state of improvisation.

Accountability and Professionalism

In addition to the learning challenges posed by unreliable organisational memory, the concept of peripheral participation in a networked structure points to other limitations on the ability to exploit knowledge and resources. In the Afghan camps, al-Qaeda had the opportunity to evaluate trainees, choosing only the best for formal participation in operations, as little as 10–30 per cent according to some estimates (Sageman 2004, 121). As a looser, improvised pattern of learning comes to replace the more traditional pattern of trainers providing instruction to trainees in these camps, accountability and professionalism may decline. Without hierarchical oversight in Afghanistan holding mujahedeen accountable for material learned in formal training, the scattered clusters of al-Qaeda militants are likely to be less professional in their improvised attempts at participation. Missing the socially exhilarating experience of training together in Afghanistan along with

its stamp of legitimacy, they may also find learning through legitimate peripheral participation more problematic.

Several post-9/11 attacks fall into a pattern of reduced accountability and professionalism. According to Sageman, the locally devised terrorist plot against US naval vessels in the Straits of Gibraltar, planned in the summer of 2002, disintegrated as a result of communication failures between the cell leader, al-Thubayti, and central control (2004, 52). The Casablanca bombings of 16 May 2003 also demonstrate improvisation and diminished professionalism. These plotters, in contrast to those with more robust training in the Afghan camps, were hurriedly trained during weekend camping trips outside Casablanca (Frantz et al 2004). Allegedly funded by al-Qaeda, they had aimed to continue the organisation's trademark style of coordinated, simultaneous attacks by setting off five simultaneous bombs, but their improvised explosives were heavy and unreliable, and only one resulted in mass casualties (Sageman 2004, 53). One of the attackers may have got lost, moreover, and detonated his bomb in front of the wrong target (Sciolino 2003).

Peripheral participation as a means of learning also depends on newcomers having 'legitimate access' to an organisation's culture of practice—its more experienced members, typical artefacts and the face-to-face storytelling that tends to strengthen an organisation's sense of self. Learners can make the organisation's culture of practice their own when they have legitimate access to its components, which should ideally be 'transparent' to newcomers, or available for their inspection. In Afghanistan, learners could immerse themselves in the rich culture of modern Islamist militancy as they trained for jihad. They had access to scores of other mujahedeen, including those with experience fighting in the Soviet–Afghan War who could tell rousing stories of victory over the Soviet superpower. Religious instruction offered a pervasive legitimising discourse that explained why martyrdom was the right path, including elaborate justifications for killing and torture in the name of jihad, allegedly found in the tenets of Islam.

Without the central, long-standing base in Afghanistan, al-Qaeda's culture of practice is less transparent to newcomers, making their ability to learn through peripheral participation more tenuous. In a networked, geographically diffuse structure, 'legitimate' access to this culture in particular may be more uncertain. Newcomers who previously could rely on Afghanistan as a well-established, unquestionably legitimate means of participating must find other outlets, which may or may not be seen as 'legitimate' by the al-Qaeda leadership or even by themselves. A fractured culture of practice, confused by questions of legitimacy, raises the costs of learning through peripheral participation by making it harder to know where, when and how to participate. One example of this effect may be the reported low morale among al-Qaeda-influenced jihadists in the early days of the Iraqi insurgency, when the legitimacy of Zarqawi's relationship with al-Qaeda was unclear.[11] Indeed, one reason Zarqawi apparently allied with bin Laden, despite their differences, was to enhance the imagined legitimacy of his support network in Iraq using the al-Qaeda brand. Even so, these differences may have continued to cast his 'al-Qaeda legitimacy' in doubt from the perspective of potential recruits, as when the al-Qaeda leadership reportedly disapproved of Zarqawi's tactics

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[11] See *CNN News* (2003).

(Weaver 2006). Without the unifying, galvanising experience of the Afghan 'jihad capital',[12] such differences could intensify, diminishing the channels of legitimate access open to learners.

Yet information and communications technologies are helping learners compensate for the loss of legitimate access in Afghanistan, as will Iraq's battlefields if state-building efforts fail. The Search for International Terrorist Entities (SITE) Institute, a research group that tracks al-Qaeda's internet use, has drawn attention to the explosion of al-Qaeda-related websites after 2001, which demonstrates that the artefacts and resources of al-Qaeda's culture of practice are migrating online. Al-Qaeda has published more than 10,000 pages of written training material, much of it culled from British and American military training guides, and more than 100 training videos that are now being converted to digital format (Venzke and Ibrahim 2003, 7). Sections of the *Encyclopedia of Jihad* are online, as are inspirational videos, training manuals and recruitment drives—such as those orchestrated by Zarqawi before his death (Weimann 2005). Theories about computer-mediated communication (CMC) may prove valuable in predicting the outcome of these online efforts to recover. For example, the 'hyperpersonal' effect suggests that online communicators who anticipate a long-term relationship might idealise one another in the absence of visual input and nonverbal cues (Walther et al 2001). With a more elaborate online presence, far from seeing commitment to its cause decline, al-Qaeda could benefit from a parallel ideological effect as potential recruits romanticise its mission.

In any case, it remains unclear how a growing reliance on CMC will affect peripheral participation as a way of learning, especially its exploitation component. After the Casablanca bombers realised their home-made bombs were insufficient for the 16 May 2003 attack, they found a formula on the internet that helped them build a more reliable bomb the day before the operation (Sageman 2004, 54). While chemical weapon recipes, bomb formulas, and training videos may be more widely available by virtue of the internet, the more intangible resources required for their successful application are less likely to be picked up online. Expertise, skills and know-how are not as easy to codify and share through a discussion forum, webpage, email or training video; the elusiveness of such know-how underscores the importance of the formal, hands-on training previously available in Afghanistan. The internet, though providing access to countless resources of the more explicit and codifiable variety, does not guarantee the ability to exploit them effectively.

Responding to Innovative Improvisers: Does It Take a Network to Fight a Network?

Innovative improvisers, then, may be the heirs to al-Qaeda in a more networked, dispersed mode of organisation. Drawing on perspectives from organisational theory, this paper has explored the learning implications of the transition, focusing on decentralisation and diminished hierarchical control after the loss of Afghanistan as a central base for planning and training. It has suggested a widened space for

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[12] Sheikh Abu-Hamza al-Masri is quoted in Gunaratna (2002, 132), referring to Afghanistan as the 'land of jihad' or 'jihad capital'.

exploration, as the more diffuse structure opens up new possibilities through inter-organisational cooperation, weak ties and local experimentation. Expanded access to ideas and resources around the world builds the potential of these terrorists to innovate. But the argument presented here also predicts a limited ability to exploit resources professionally, counteracting the learning benefits of exploration. An improvised, less accountable pattern of learning through peripheral participation, with uneven access to organisational memory and ambiguously legitimate channels, makes exploitation far more uncertain.

This discussion has, of course, been largely theoretical, aiming to draw out hypotheses from organisational theory that further our understanding of learning within transnational terror networks. Al-Qaeda is a very complex non-state actor; it is a religious fundamentalist network with a loose set of political grievances articulated in militant revivalist rhetoric. While organisational theory literature that is based largely on private sector firms can only take us so far, it can lead the way toward research that more fully explains the kind of power wielded by such networks. John Arquilla and David Ronfeld's influential 'netwar' model portrays them as flexible, adaptable and resilient adversaries posing special challenges for more hierarchically structured states. Yet al-Qaeda is not necessarily so agile a player. The analysis in this article suggests assumptions like these depend more subtly on the mechanisms of learning in transnational terror networks. Even if a looser, networked structure opens up more possibilities for adaptation, al-Qaeda may fail to exploit them if its mechanisms for learning are poorly developed.

What countermeasures might states introduce to respond to innovative improvisers? The broader exploration capabilities highlighted in this paper, while aiding innovation in terrorism, also bring to light structural vulnerabilities. Dispersed al-Qaeda fragments, operating more independently and looking outward for assistance and support, may be more vulnerable to infiltration as a result. Some counterterrorism specialists have doubted the ability of human intelligence, especially Western in origin, to penetrate tightly knit and religiously guarded al-Qaeda cells based on family and ethnicity. Without recourse to Afghanistan for financial support, training and planning, however, such cells' reliance on existing societal infrastructures around the world may grow. If it is true that they are 'enmeshed in the socioeconomic, cultural, and political fabric of migrant and diaspora Muslims' (Gunaratna 2004), such broad exposure should widen the pool of potential informers. It was already shown how openness to weak ties, a double-edged sword, can threaten security.

The discussion of exploitation in this article also points to related weaknesses. As more ideas and resources become available to innovative improvisers, through the internet and other means, the value of experts who know how to exploit those resources will rise. In Afghanistan, under the protection of al-Qaeda leadership, recruits could expect such experts to be made available to them, and their credentials established and backgrounds checked for security purposes. Forced to improvise in the more networked, diffuse structure, learners may seek out such experts with growing desperation. Counterterrorism efforts might therefore focus on identifying and apprehending these valuable players to prevent unprofessional, poorly orchestrated attacks from advancing in scope and sophistication. Another approach would take advantage of widespread eagerness to tap into dispersed sources of expertise, using deception to trap innovative improvisers by seeming to offer exactly what is needed. Studies of how credibility and the impression of

authority are constructed online, where newcomers may increasingly turn for learning assistance, could help inform this approach.[13]

Further research should investigate the interaction between networked non-state actors and states in more depth, testing the validity of hypotheses offered in this paper against the empirical record. The theoretical 'netwar' framework suggests it 'takes a network to fight a network', and US intelligence reforms have rushed ahead based in part on similar assumptions about the nature of al-Qaeda as a networked adversary.[14] A more networked organisation may be better positioned to deal with this actor, but more research is required to understand the circumstances under which that hypothesis holds. To adapt, for example, it may be less important for states to develop 'network' structures per se than to improve their own capacity for innovation and learning, involving but not limited to building networks into their national security communities. According to political scientist Thomas Homer-Dixon (2002), the interconnections between rapidly developing technologies and economic systems are growing more complex, making it ever harder to anticipate the full range of possible attacks. 'Complex terrorism' arises from the unexpected connections attackers will make between components of these systems and their own capabilities—like passenger airliners, martyrdom and skyscrapers. Poised to identify and explore such novel connections, networks of innovative improvisers generate a fair amount of uncertainty in the security arena. States may therefore find that more diverse capabilities for innovation and learning are necessary to handle such a wide array of potential adversaries and modes of attack.

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[13] See, for example, Wallace (1999) for a discussion of the formation and management of impressions online. For a more specific examination of how two non-state activist groups attempted to enhance the credibility of their causes and agenda through competing websites, see Calvert Jones (2005).

[14] See the *9/11 Commission Report*, for instance, which describes the need for a decentralised, network model of information flow in the national security community in order to combat fluid networks of terrorists (National Commission on Terrorist Attacks upon the United States 2004).

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