University of Salford
A Greater Manchester University
University of Essex
ESSEX BUSINESS SCHOOL
International Centre for Entrepreneurship Research
The General Jonas Žemaitis Military Academy of Lithuania
Ministry of National Defence Republic of Lithuania
Vilnius Gediminas Technical University
RISEBA
Estonian Business School
NATO Energy Security Centre of Excellence
ENTREPRENEURSHIP AND SUSTAINABILITY CENTER
AVADA

JOURNAL OF SECURITY AND SUSTAINABILITY ISSUES
ISSN 2029-7017 print/ISSN 2029-7025 online
2015 June Volume 4 Number 4
http://dx.doi.org/10.9770/jssi.2015.4.4(0)

SECURITY FACETS: COMPLEX DYNAMIC SYSTEMS AND LEADERSHIP IN MILITARY

Ronaldas Endrijaitis[1], Arūnas Alonderis[2]

[1,2] The General Jonas Žemaitis Military Academy of Lithuania
Šilo Str. 5A, LT-10322 Vilnius, Lithuania

E-mails: [1]ronaldas_endrijaitis@hotmail.com; [2]aalonderis@yahoo.com

Received 10 March 2015; accepted 25 May 2015

Abstract. Present world has no clear balance between economic and political forces. Conflict initiators use all possible sanctions and unconventional means and ways and have no clear and permanent structure and allies. Traditional leadership and actions in conflict zones are not effective. Complex dynamic systems (CDS) paradigm allows understanding better the essence of chaotic processes in conflict zones and acting efficiently.

Keywords: security, complex dynamic systems, leadership, chaos, order, management, organization, members

Reference to this paper should be made as follows: Endrijaitis, R.; Alonderis, A. 2015. Security facets: complex dynamic systems and leadership in military, *Journal of Security and Sustainability Issues* 4(4): 299–309. DOI: http://dx.doi.org/10.9770/jssi.2015.4.4(0)

JEL Classifications: F60

1. Introduction

Today the world is multiple where the U.S. dominates and the opponents have chosen asymmetric confrontation. There is no clear set of conventional measures and balance as well as dominating powers influencing the world. Many players of different rank and interest form unions that are neither long-term nor durable. When traditional methods of extracting oils wavered, the role of powers' leverage based on traditional methods of extracting oils changed as well (Bar-Yam *et al*., 2004; Endrijaitis, Alonderis 2015). The upcoming age brings tough challenges, perhaps even tougher than we had, i.e. 'chaos, extremism and aggression' around the world with 'horrendous' problems.' We do not have much time to prepare for them and for what will drive global conflict (Jacobs, Clement 2007; Dyson 2015; Ward 2015).

The main players facing challenges and crises are the armed forces and the complex of interrelated conflict participants, i.e. mass media, politics and economics. If any of these elements is affected, the impact is felt allover. The cooperation of the military and media is apparent as the media influences the significance of victories and defeats of the battles that take place in social networks, television and media.

Ununiformed enemies of unknown origin, undefined and fast-changing missions, cultural vulnerability of servicemen and chaotic environment are characteristic of present and future battles. Military leadership was designed when an enemy was evident and predictable, the role of a leader was defined and no forbidden methods were applied. *The international community has largely lost its capacity to prevent conflict and dissolve conflicts. This is a world where there is no effective leadership* (Thomas 2009; Sambira 2015). Conflict zones

saw the emergence of soldiers having no citizenship, fighting foreign citizens, paramilitary units with no clear subordination and having temporary allies.

The U.S. Army commanders acknowledged that they fight with an enemy of a new type who learns, changes and adjusts to a new environment. When the U.S. servicemen reveal rebels' strategy, it is changed to another one. A state incurs considerable expenses while protecting itself from terrorist attacks as protection means are developed in line with the latest attacks. Furthermore, judging from experience, terrorists actions are never recurrent. They do not have a center of gravity, leadership or hierarchy, thus, terrorists do not make up an organization, their manner of acting resembles that of a swarm. They adjusted a suitable structure ensuring durability to their needs. There is a tendency for coordinated uncontrolled actions and organizations without leaders that are more efficient in achieving aims (Wheatley 2007). They are united by a passion to act together in achieving a common goal. Although their attitudes may differ leading to a conflict in the future, it is not an obstacle for common activities.

Terrorists' communication network originated from chaos and focused on emotions and importance instead of structure and chain of command. The beginning of its creation was different from that of a traditional mechanical system. Many current programmes started concentrating on an unstable, unclear and chaotic environment of military operations. The programme *DoD* trains leaders for long-term actions against radical formations without clear position, origin or attitude using information technologies, terrorist attacks, tactics and web communities, thus compensating the lack of military power. Present effective leaders created programmes focused on wide-ranging operations for conventional and unconventional environment. Dynamic leaders' skills are necessary for such circumstances, whereas established programmes have to address such challenges (Wheatley 2007; Thomas 2009).

Ironically, the worldwide information technology and other companies were established in a similar way. Their establishment was inspired by ideas that seemed unreal, illogical and inadequate according to some, however, now they are brilliant founders of various companies. Terrorist organizations and leaders as well as investors are recognized and evaluated when they already have power.

The comparison of traditional information and communication network in the classic hierarchy organizations, such as corporations or military, and CDS in the rapidly changing environment revealed that the CDS communication network was more efficient. It is beneficial to encourage communication among employers for decision-making in the future. It is necessary to establish new working structures in the organizations as traditional institutions having classic hierarchy system use command and control method. Refusing hierarchy, adaptive and progressive organizational structure turns into hybrid network structure the potential of which is beneficial for all the organization, not only for hierarchy structure based on individual benefit. However, linear attitude analysis does not address social network complexity or multiple interactive systems. The military considers leadership as a sickle and a problem as a nail; consequently, it has to start looking for a new paradigm for transformation (Paparone 2004; Bar-Yam *et al*. 2004; Livingood 2014).

Commanders and their subordinates have to think about their organizations and operational environment in terms of complex dynamic systems (CDS) and paradigm. Operational environment requires commanders and their personnel to understand causal complexity (Livingood 2014).

W. Edwards Deming said: 'If you can't describe what you are doing as a process, you don't know what you're doing' (Dorling Kindersley Publishing 2014).

However, when a process or an organization as a dynamic system is too simplified or trivialized, they are treated as primitive mechanical systems.

Mechanical thinking cannot fully review human and social systems that are complex and dynamic. When dynamic social systems are treated as simple mechanical ones, the opposite results are expected. If a person does not have a base in systems theory and causal logics, he or she will not go deep analyzing reasons affecting

interaction in a certain environment. Besides system theory, operation planners tend to use standard doctrine processes and means leading to planning routine and oversimplification of operations (Reed 2006; Livingood 2014).

Communication links of terrorist organizations are passionate and meaningful and not of traditional command leadership. It is a spider web without a spider becoming more innovative in the local level than leadership while being on the top. If individuals are free to invent their own ways to demonstrate support for their cause, they will invent even more destructive actions competing with each other for the most spectacular attack (Wheatley 2007).

We notice that when speaking about terrorism, the same terms are used as when speaking about business. The same laws are applied for all the CDS as well. If we change the word 'business into 'terrorism' in a text, the same text might not alter much.

Mendelsohn (2015) writes about Al-Qaeda's franchises that are used by terrorist organizations and assign responsibility and liability for the brand name.

Terrorism can be analyzed by applying the same tools as the ones used for business researches. Research tools are universal for all the CDS.

A tool for analyzing a firm's position and competition is market mapping, including diagrams indicating market and product place in the market. Market mapping combined with SWOT analysis discover opportunities and decide whether the firm has the strengths to exploit one of those opportunities. Market map helps to inform the strategy and tactics that will help a firm to achieve that strategy goal. A challenge for management is to use the map and knowledge of internal strengths and weaknesses and plan appropriate strategic response. Both SWOT analysis and market mapping allow a firm to better understand itself, its market and competition (Dorling Kindersley Publishing 2014; Duncan, Coyne 2015; Jacobia *et al.* 2015).

Market vacuum is a business possibility for a new product, whereas political and state institution vacuum is a possibility for terrorist organizations.

A country has long been vulnerable; a vacuum created by a deepening political crisis and collapse of state institutions is an attractive arena for terrorist groups (Howard 2015; Ward 2015).

2. Security Facets: Leadership Style of Complex Dynamic Systems

Technology continuously develops and gains increasingly greater significance in many fields, including warfare. They generate data and shape a decision; however, they are approved and made by people without whom technology can function only according to some installed standard programmes.

Technology will likely compound the stress on battle decision-makers, and leadership far more than technology will determine who wins and who loses. What, then, is the role of leadership in complex organizations? If leaders cannot predict and control an organization's future, what do leaders do? In any Army, in any time, the purpose of 'leadership' is to get the job done (Ulmer 1998; Plowman *et al*. 2007). Assessing the situation in accordance with the CDS theory, new or old technologies as well as operating methods are applied. However, the essential element, i.e. a leader, has to be aware of the situation and be able to act efficiently. There is no such technology that could compensate a decision maker's shortcomings.

Leaders disrupt existing patterns of behavior, encourage novelty and make sense of emerging events for others. From a complexity view, leaders do not *direct* change or *control* future outcomes as traditional leadership research suggests. Leaders, as enablers, use the following mechanisms: disrupting existing patterns, encouraging novelty and making sense of the unfolding events for others (Plowman *et al*. 2007).

Table 1. The role of leaders as enablers in emergent self-organization.

Mechanisms used by complex leaders	Actions taken by complex leaders	Propositions	Managerial implication
Disrupt existing patterns	• Create and highlight a conflict; • Acknowledge uncertainty;	Complex leaders *enable* emergent futures by disrupting patterns through the use of conflict and uncertainty, whereas traditional leaders *create* knowable futures by minimizing conflict and eliminating uncertainty.	• Leaders destabilize rather than stabilize organizations.
Encourage novelty	• Establish simple rules; • Encourage 'swarm-like' behaviors; • Promote non-linear interactions;	Complex leaders become enablers of emergent self-organization by encouraging innovation through simple rules, non-linear interactions, and swarm behaviors; whereas traditional leaders operate as controllers by leading through command and control.	• Leaders encourage innovation rather than innovate.
Act as sense-makers	• Create correlation through language; • Accept the role of 'tag';	Complex leaders become enablers of emergent self-organization by being sense-makers through correlation and becoming tags, whereas traditional leaders operate as controllers by directing order.	• Leaders interpret emerging events rather than direct events. • Leaders manage words rather than manage people.

Source: Plowman *et al.* 2007

By understanding the nature and importance of communication and practicing effective communication techniques, leaders will relate better to others and be able to translate goals into actions. Communication is essential to all other leadership competencies. Leaders have responsibility to establish and maintain positive expectations and attitudes that produce the setting for healthy relationships and effective work behaviors. Leaders are charged with improving an organization while accomplishing a mission. They should leave an organization better that it was when they arrived. Most Army service members continue to think of themselves as professionally communicating within a hierarchical chain of command. Despite the Army's common narrative, Army service members engage with each other via networks of relationships that cross a variety of hierarchical echelons (*(What an Army Leader Is)* (LDP 2009; Livingood 2012).

Leaders rather destabilize than stabilize CDS organizations. While achieving a goal, they move organizations from a stable position to instability (even though a stable position is long-term), as only instability originates novelty and self-organization. Leaders encourage innovations; they do not develop them themselves. By promoting indirect relations, leaders foster to be innovative. They emphasize the process of change and identify changes, thus getting closer to the ones that employees speak. Leaders change an organization and explain them to employees. Learning to engage with the organization as if it is a living system is much more effective and sustainable than in our traditional way of trying to impose our will (Plowman *et al*. 2007; Knowles 2014).

Present conflicts change classic conflict rules and laws making it an advantage (or even a necessity) to leaders act despite CDS theory laws. For positive results, it is necessary to transform existing organizations so that they could operate despite the CDS laws.

Leadership is an ongoing process and only a few can purposefully engage the natural tendency to self-organize. The Joint and Army Doctrine implicitly reinforce the idea that leaders must understand systems theory via operational design, Army design methodology and definitions of leadership (Knowles 2006; Livingood 2012).

Lasting change requires organization people to fully participate in the process by communicating, creating and sharing knowledge. The actions of all the collective increases the possibility of successful military operation by cooperating through all the levels of command. The primary role of the leader is to make sure that the organization has a deep inner integrity. To get that clarity requires experimenting with different processes, bringing the whole system of the university together – having a conversation about who we are, what we serve, what we think is possible with the resources we have, who we could be (Wheatley 1997; Wenger 1998; Livingood 2012).

Conflicts will require decentralized leadership, the ability to build and lead a military and civilian network. This notion of connectedness suffuses all of the Army life. Commanders recognize that the professional relationships they maintain with other members of their organization change as they move between roles. Often seen as the "glue" of the military community, spouses link members of the military and local civilian community with each other and sometimes learn critical information regarding community faster than the commander. The point of this quote is that things spread through networks, across ties and a position in the network matters as much as the architecture of the network (Livingood 2012; Ward 2015). However strict organizational hierarchy, the CDS laws are to be ignored or used.

The perspectives are arranged around the circle in Figure 1 and the internal lines show the interconnectedness of the parts. A change in any part results in changes in all the other parts. The web of connections is like a nervous system with each perspective informing all the others. As in a nervous system, some connections are stronger than others; the connections need to function in a specific order (Knowles 2001). The impact on any part of the system might occur (but not necessarily) in any other part as all of them are more or less interrelated.

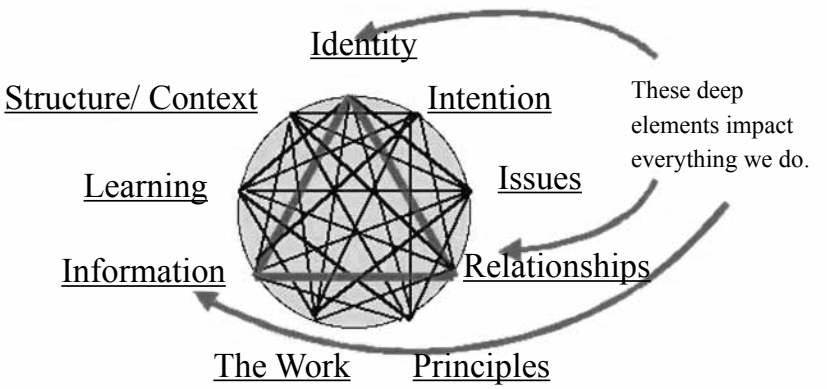


Fig 1. The domains of self-organization.

Source: Knowles 2001

In order to make organization members participate in changes instead of fighting against them, the members must be involved in them. The leaders who enact or initiate reforms should be able to step out of their comfort zone and balance on the threshold of chaos, thus mitigating the level of control (Kaminski 2000).

The transformational leader empowers subordinates to achieve the goals of the organization. They see developing and growing others as more important. Self-organizing occurred extensively as one person after another stepped up to take one of the multitude of tasks facing us. The organization became "leaderful" (Knowles 2001; Matthews 2014). Involving subordinates in active common activities to reach common aims is an essential prerequisite for an organization's self-organization and adaptation. If it is not able to self-organize, it is not adaptive and it may be hit by crisis. Still, using available resources an organization has to be engaged in continuously reaching its aims and at the same time even devoting some energy for self-organization making it an aim as well.

In military settings, this is often bound up in charismatic leadership but does not depend on it. It depends more on a high degree of competence in interpersonal communications or emotional intelligence. Ideas are a fundamental output of the top-level leader who carefully selects influential ideas and communicates them to outsiders and insiders alike. Leaders inculcate these ideas in their public affairs offices and repeat them among the staff (Harstad 2004; Thomas 2009).

The Department of Defence is a large and complex social system with many interrelated parts. As any system of this type, when changes are made to one part, many others are affected in a cascading and often unpredictable manner. Organizational decisions are fraught with second- and third-order effects that result in unintended consequences. Extensive planning – combined with even best intentions – does not guarantee success. There

are so many interactions in complex systems that no individual can be expected to forecast the impact of even small changes that are amplified over time (Reed 2006).

The impact of the CDS elements on each other or general process is a peculiarity of the CDS. They influence each other not only with changes but also being passive or acting not at full capacity and top-quality level.

Concepts and approaches embedded in the systems thinking literature:
- focus on the purpose for which a system was created over the processes and procedures of the system.
- Simple cause-and-effect relationships are insufficient to understand or explain a complex social system. Patterns over time and feedback loops are a better way to think about the dynamics of complex systems.
- think in terms of synthesis over analysis; the whole over the parts. Busyness and excessive focus on short term gains interferes with ability to use systems approach.
- Leaders must see what is actually happening over what they want to see happen.
- Thinking about systems and their dynamics suggests alternative approaches and attunes leaders to important aspects of organizational behavior, especially in military organizations that value tradition and standardization (Reed 2006).

The war front requires leadership – inspiring a team, demonstrating commitment, sharing troubles and challenges, and engaging in complex problem-solving. The home front, conversely, is a setting for management, i.e. filling time, being sure to complete tasks, and exercising simple problem-solving. The leader must be well-trained and educated to make split-second decisions in ambiguous circumstances balancing the best tactical decisions with cultural and regional dynamics (Slocum 2013; Ward 2015). The actions taken by the organization have to be adaptive and adjusted to existing conditions and requirements; they can also be changed or made favourable.

Military leaders interact with civilians, non-government agencies and host other formal and informal groups to achieve their objectives. The military must work with civilian leaders and locals who are aware of the terrain and culture better than any foreign actor is; and lead the coordination between all parties working toward victory.

The art is to help such communities find resources and connections without overwhelming them with organizational meddling. This need for balance reflects the following paradox: no community can fully design the learning of another; but conversely no community can fully design its own learning (Wenger 1998; Matthews 2014; Ward 2015). In previous conflicts both sides fought over resources and natural resources in order to equip their troops. Now a crucial factor in conflicts is a support of local organizations, people and their participation on either side. We follow media and social networks for ongoing battles, thus expressing support. An event in the battlefield or a conflict between two sides is reported by the media in the light of the locals' opinion presenting it for their own benefit by incorrectly interpreting or changing the facts. Locals, business companies and various organizations (previously – energy resources) play an important role in present conflicts.

3. Security Facets: Military Strategy of Complex Dynamic Systems

The U.S. started changing its military forces to increase action accuracy for particular results that could have effect despite the CDS laws. The systems approach incorporates a new concept called Effects-Based Operations & Planning. It should help to define orders of effects and consequences of actions taken in handling asymmetric warfare. The U.S. military has decided to develop the capabilities to consciously affect a multitude of levels of effects. The national military strategy is shifting from preparing only to fight and win traditional wars focusing on preventing (shaping) and discouraging (deterring) armed conflict broadly defined to include war between nations and irregular war (Bar-Yam *et al*. 2004; Matthews 2014). Treating conflicts as the CDS revealed a necessity to act in accordance with the CDS laws; however, it changes response and operation methods. Changing conflicts change response and actions. To act efficiently, it is necessary to change command, communication principles and principles of organization members.

The goals of the Department of the Navy Objectives deploying innovative leaders in all the levels of command include combat capabilities of speed, agility and adaptability. The Army Leadership doctrine emphasizes the far-reaching consequences of a leader's decisions. The Army Doctrine Reference Publication (ADRP) 6-22 indicates the use of systems and social systems theory as a baseline. It does not explain how a military leader should think about the terms 'complexity', 'uncertainty' 'unintended consequences' or 'systems' (Thomas 2009; Livingood 2012).

The effective capability can be realized through the integration of existing and future military systems of systems (SoS). The future of engineering systems will require their incorporation into increasingly integrated complex SoS. The Joint Doctrine and Field Manual (FM) 3-24 *Counterinsurgency* requires a commander and his staff to use systems thinking within operational design methodology. The FM 3-24 contains a definition of what the term 'systems thinking' means. Systems thinking involves developing an understanding of the relationships within the insurgency and the environment. It concerns the relationships of actions within the various logical lines of operations. That seeks to understand the interconnectedness, complexity, and wholeness of the elements of systems in relation to one another. While a contestable definition, it is the only attempt to define systems thinking, in any joint or army doctrine and is not included in any terms or definitions list. The U.S. military has begun to develop a more holistic approach to counter asymmetric competition in developing interoperable systems that can be used interdependently (Bar-Yam *et al*., 2004; Livingood 2012).

The traditional mechanical system will face or is even facing now problems caused by the CDS laws; therefore, a question arises if a mechanic-traditional military system is able to cope with the CDS problems without major self-organization.

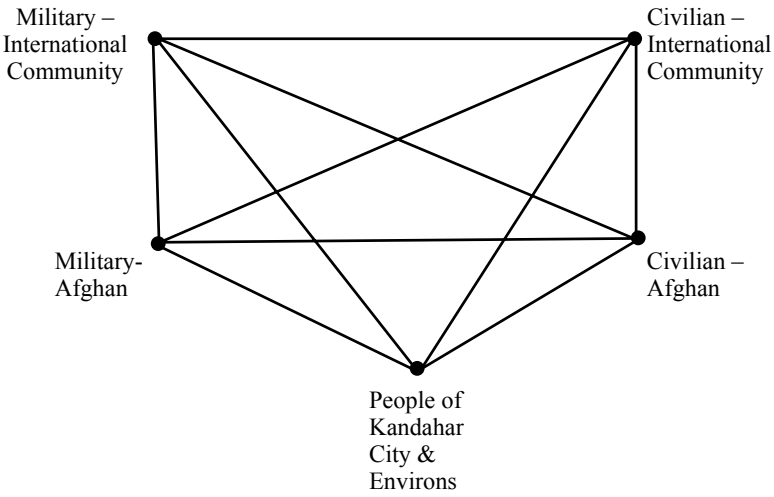
Leaders fail to identify exactly how organizations and networks interconnect with each other. For example, in the field of intelligence, progress is being made by focusing not only on the paradigms of photos and maps but also by new techniques of influence diagramming, interactions between individuals, organizations, insurgent networks, criminal patronage networks, security effect networks, and governance building networks (Harstad 2004; Livingood 2012). It is necessary to perceive the whole with all its laws, not just how separate pieces compose a picture. Each service was built in response to its specific environment; each of them has systems within systems of specialization. This complexity within itself is driving each to look at its own SoS. This interoperability will generate interdependence (Bar-Yam *et al*. 2004). System parts have to be relatively autonomous and independent as separate systems; however, they must be able to act efficiently together as a system.

The Army commanders must build 'horizontal relationships' with both governmental and non-governmental organizations that have no equivalent rank structure. Commanders appreciate that strong connections both hierarchical and non-hierarchical are key to being an effective leader. A system is more likely to survive if it has many participants of varying size along with an assortment of contested issues. Complex systems as adapting to the absence or failure of a part. Army leadership points out the importance of building and maintaining relationships for strategic and tactical benefit (Harstad 2004; Livingood 2012). The fight is concentrated on destroying enemy's system, i.e. cut off connections, destroy system parts, create vacuum and fill it in with sophisticated system. To destroy the enemy's system, it is necessary to have a reserve of efficiently operating system parts and create new system parts together with the locals. This is the way a new, efficient and joint adaptive system is developed.

The mission was articulated in terms of a battlefield where commanders must balance time and resources between building unified partner networks and deconstructing enemies and their connections. Partners and subordinates were cautioned to carefully understand and apply behaviors, connections, interactions, and relationships to create positive outcomes and incorporate more people into legitimate systems. Knowing how to harness the power of social media, it can be used to reach out to the local population. The aim is to seek to understand complex operational environments filled with networks of actors and their connections (Livingood 2012; Matthews 2014).

IJC Mind Map of "Afghan System": Operation Omid Partner Team - Kandahar City
Synchronization of Unified Action: "Prepare government activities first"
Resequence interaction with the local population; Resynchronize internal systems

Actors/Agents:
1. Partner Team
   International Community
   a. Civilian
   b. Military
2. Afghan Partners (AP)
   a. Civilian
   b. Military
3. People and systems of Kandahar City and environs



Evidence of Systems Thinking:
1. Describing the Kandahar City+ environment in terms of actors, their connections and the outcomes of re-sequencing both partner team internal interactions and partner team local (Kandahar) interaction.
2. Networks:
   A. Unity of Effort Partner Team: International CommunityfCivilian and Military); Afghan (Civilian and military)
   B. Partner Team security effects operations
   C. Partner Team - Build local governance capacity operations
   D. The pre-existing systems and subsystems of Kandahar City and environs (pre-Omid)

Fig. 2. Operation Omid Partner Team, Kandahar City.

Source: Livingood 2012

Transcript text: the *partnered team* learned some *significant lessons* during those operations that they were *able to apply* in the summer and fall of 2010 in *Kandahar City* and its environs. Several of these lessons included the need for prior planning *to prepare government activities in advance* (Livingood 2012). Independent parts will be combined into a single CDS. No vacuum should be left so that a terrorist system could try to occupy it.

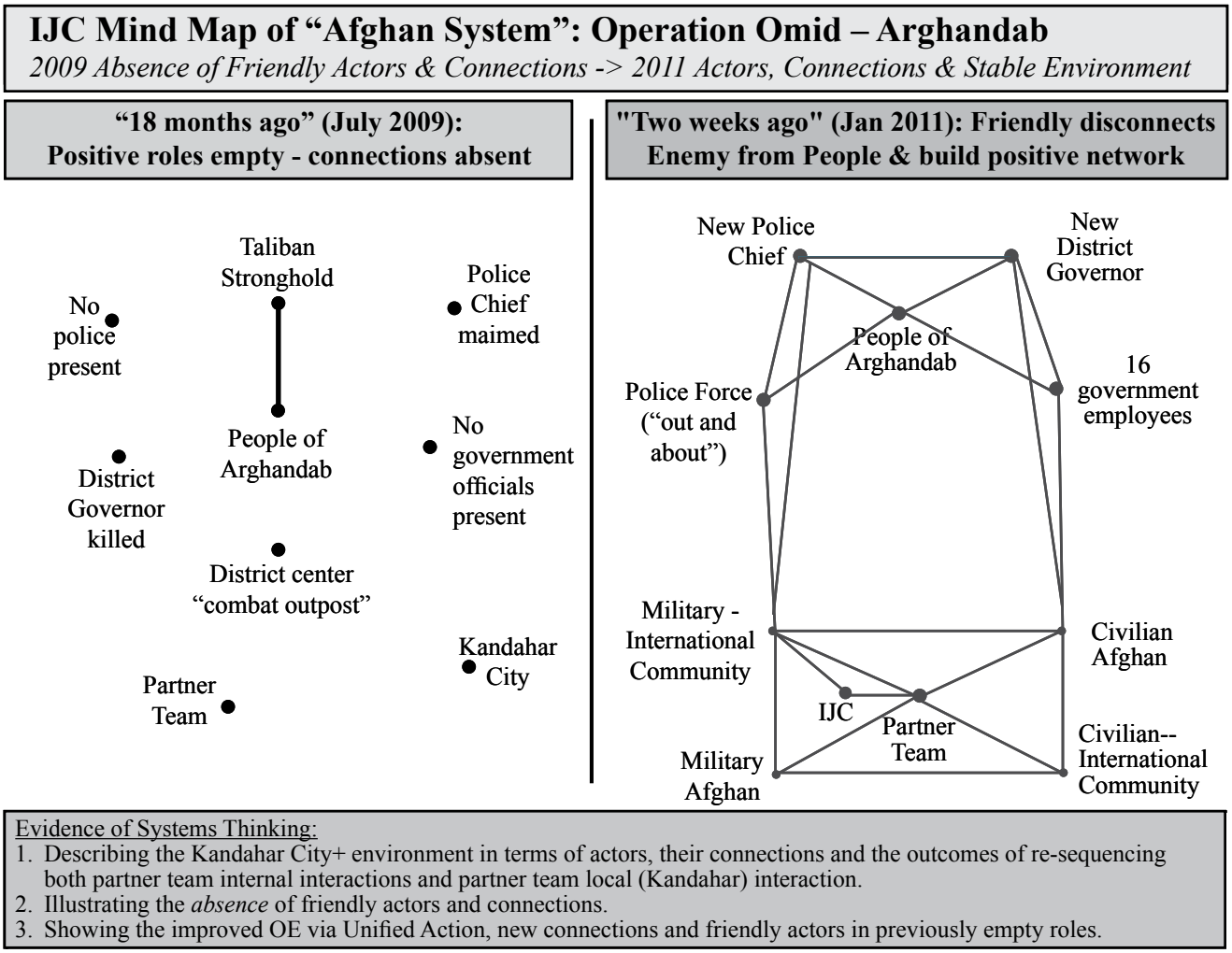


Fig. 3. Operational Omid, Arghandab.

Source: Livingood 2012

In Arghandab, a district just outside Kandahar City, a Taliban stronghold was built in July 2009. In a *18-month period*, there were *no government officials* or *police present* except for the district center, which some of the Afghans described as a combat outpost. A significant change after the period was the *government employees* working with a new district governor. There was a new police chief who had police force out and about. Also, the people on a Friday afternoon, Afghan family time, were out picnicking in the Arghandab River Valley (Livingood 2012). An apparent difference was between former fragile system without regular relations, efficiently operating parts with lots of vacuum and the new one with good relations and no vacuum.

A successful military leader must be adroit at working with other governmental and non-governmental agencies to accomplish their mission. Interdependence has to prompt the evolution of multiple interdependent systems into a completely new overall system. There is a considerable interest in exploring the possibilities of going to an organization where interdependence is the rule, not the exception. Knowing how to leverage military power to achieve objectives is crucial to long-term strategic success (Bar-Yam *et al*. 2004; Matthews 2014). The creation of new and efficient system comprised of interrelated individual parts is the military leaders' aim. The solution of present conflicts or fights is a creation of a new system.

Conclusions

- Present military leadership has to correspond to the chaotic origin of present conflicts.
- Boundaries between conflict and aggressive competition and the use of conventional and unconventional measures keep blurring.
- Present terrorist organizations have no usual hierarchical structure, it is chaotic; they do not have permanent leaders and are treated as dangerous too late.
- Mechanical thinking, organizations and leaders become inefficient or do not meet the CDS laws in chaotic processes.
- The CDS research tools are universal.
- Vacuum opens up a possibility for the CDS to emerge.
- A role of a leader in the CDS organization differs from the one in a mechanical organization.
- A formed critical mass of locals will accept and support its favorable system.
- A local CDS (population, companies, organizations, etc.) plays a decisive role in a conflict zone.
- Military units have to make up a full-fledged CDS to fight efficiently a terrorist CDS in a chaotic conflict.
- The CDSs fight against each other, thus filling up the vacuum.
- The creation of new CDS is a way to defeat terrorists in their occupied territories.

References

Bar-Yam, Y.; Allison, M.A.; Batdorf, R.; Chen, H.; Generazio, H.; Singh, H.; Tucker, S. 2004. *The Characteristics and Emerging Behaviors of System of Systems*. NECSI: Complex Physical, Biological and Social Systems Project. Available on the Internet: <http://necsi.org/education/oneweek/winter05/NECSISoS.pdf, May 2007>

Dyson, D. 2015. Lord Rothschild: 'Investors face a geopolitical situation as dangerous as any since WW2'The Telegraph. Available on the Internet: <http://www.telegraphs.xyz/finance/personalfinance/investing/funds/11445631/Lord-Rothschild-Investors-face-a-geopolitical-situation-as-dangerous-as-any-since-WW2.html>

Duncan, T.; Coyne, Ch. 2015. The Political Economy of Foreign Intervention. Social Science Research Network. Available on the Internet <http://www.independent.org/publications/tir/article.asp?a=1012>

Endrijaitis, R.; Alonderis, A. 2015. Towards Sustainable Security: Complex Dynamic Systems and Leadership, *Journal of Security and Sustainability Issues* 4(3): 279–293 DOI: http://dx.doi.org/10.9770/jssi.2015.4.3(8)

Harstad, M. 2004. A Systems Approach to Leadership Theories. Senior Leaders Program. Pacific Leadership Academy. Available on the Internet: <http://home.earthlink.net/~harstadm/PacLead_Harstad.pdf>

Howard, G. 2015. ISIS' Next Prize. Will Libya Join the Terrorist Group's Caliphate? Foreign Affairs. Council on Foreign Relations. Available on the Internet: <https://www.psychologytoday.com/blog/head-strong/201410/21st-century-military-leadership>

Ingram, Ch. 2015. Resources and Insight for Developing Leaders. Forging Adaptive Leaders Through Crucible Training The Military Leader. Available on the Internet: <http://www.themilitaryleader.com/forging-adaptive-leaders-through-crucible-training/>

Jacobia, E., James Freunda J.; Araujoa, L. 2015. Is there a gap in the market, and is there a market in the gap? How advertising planning performs markets. Journal of Marketing Management, 31(1/2): 37–61. Available on the Internet: <http://www.research.lancs.ac.uk/portal/en/publications/is-there-a-gap-in-the-market-and-is-there-a-market-in-the-gap(8d3f9186-822f-4b8f-908a-a2da28e2771c).html>

Jacobs, O; Clement S.D. 2007. Contributions of Stratified Systems Theory to Military Leader Development and Organization Redesign in the US Army. Organization Design, Levels of Work & Human Capability: Executive Guide; Editors:Ken Shepard, Jerry L. Gray, James G. Hunt, and Sarah McArthur, 197–209.

Kaminski, J. 2000. Leadership and Change Management: Navigating the Turbulent Frontier. Available on the Internet < http://www.nursing-informatics.com/changemant.html>

Knowles, R. N. 2001. Self-Organizing Leadership: A Way of Seeing What Is Happening in Organizations and a Pathway to Coherence, *Emergence* 3(4): 112–27.

Knowles, R. N. 2006. Engaging the Natural Tendency of Self-Organization.Transformation.World Business Academy. Available on the Internet <http://www.worldbusiness.org>Knowles, R. N. 2014. Building the BOWL to Manage Organizational Change. March 19. Available on the Internet: <http://www.safetyexcellenceforbusiness.com/category/self-organizing-leadership/>

Leadership Development Program (LDP) Handbook prepare Officer Development Support Handbook Appendix A - Leadership Performance Indicators 31 July 2009. Available on the Internet: <www.armyrotc.umd.edu/docs/New%20LDP.pdf>

Livingood, L. 2012. Systems Theory, Unity of Effort, and Military Leadership. Master's Thesis. Fort Leavenworth, Kansas.

Livingood, L. 2014. Systems Theory and Military Leadership.Inter Agency Paper. Fort Leavenworth, Kansas

Matthews, M. D. 2014. Psychology and a Less Lethal Military Strategy. A new approach to war and peace. Head Strong. Available on the Internet: <https://www.psychologytoday.com/blog/head-strong/201408/psychology-and-less-lethal-military-strategy>

Matthews, M. D. 2014. The skills needed for effective military leadership have changed. 21st Century. Military Leadership**.** Head Strong. Available on the Internet: <https://www.psychologytoday.com/blog/head-strong/201410/21st-century-military-leadership>

Mendelsohn, B. 2015. Accepting Al Qaeda. The Enemy of the United States' Enemy. Foreign Affairs. Council on Foreign Relations. Available on the Internet: <https://www.foreignaffairs.com/articles/middle-east/2015-03-09/accepting-al-qaeda>

Plowman, D. A.; Solansky, S.; Beck, T. E.; Baker, L.; Kulkarni, M.; Travis, D. V. 2007. The Role of Leadership in Emergent, Self-Organization, *The Leadership Quarterly* 18(4): 341–356.

Reed, G. E. 2006. *Leadership and Systems Thinking*. *Defense AT&L,* May-June 2006.

Sambira, J. 2015. New and old conflicts behind world's "worst displacement" situation. United Nations Radio. United Nations. Available on the Internet: <http://www.unmultimedia.org/radio/english/2015/01/new-and-old-conflicts-behind-worlds-worst-displacement-situation/#.VYjVR_mqqko>

Slocum, D. 2013. Six Creative Leadership Lessons From The Military In An Era of VUCA And COIN. Available on the Internet: <www.forbes.com>

The Bussiness Book. 2014. Dorling Kindersley Publishing. p.24-27.

Thomas, J.J. 2009. Leader Development in the US Department of Defense: A Brief Historical Review and Assessment for the Future. The ADM James B. Stockdale Center for Ethical Leadership United States Naval Academy. Available on the Internet: <http://www.cgscfoundation.org/wp-content/uploads/2014/03/FtLvnEthicsSymposiumReport-2009.pdf>

Ulmer, W. Military leadership into the 21st century: Another" bridge too far? *Parameters* 28 (1998): 4-25.

Ward, A. 2015. Battleground Metropolis: The Future of Urban Warfare. How will the militaries of the world prepare? The National Interest. Available on the Internet:<http://nationalinterest.org/feature/battleground-metropolis-the-future-urban-warfare-12467>

Wenger, E. 1998. *Communities of Practice: Learning as a Social System*. Systems Thinker Available on the Internet: < http://nationalinterest.org/feature/battleground-metropolis-the-future-urban-warfare-12467>

Wheatley, M. J. 1997. Higher Education and the Forces of Self-Organization, *CAUSE/EFFECT* 20(1): 18–21.

Wheatley, M. J. 2007. Leadership of Self-Organized Networks. Lessons from the War on Terror, *Performance Improvement Quarterly* 20(2): 59–66.